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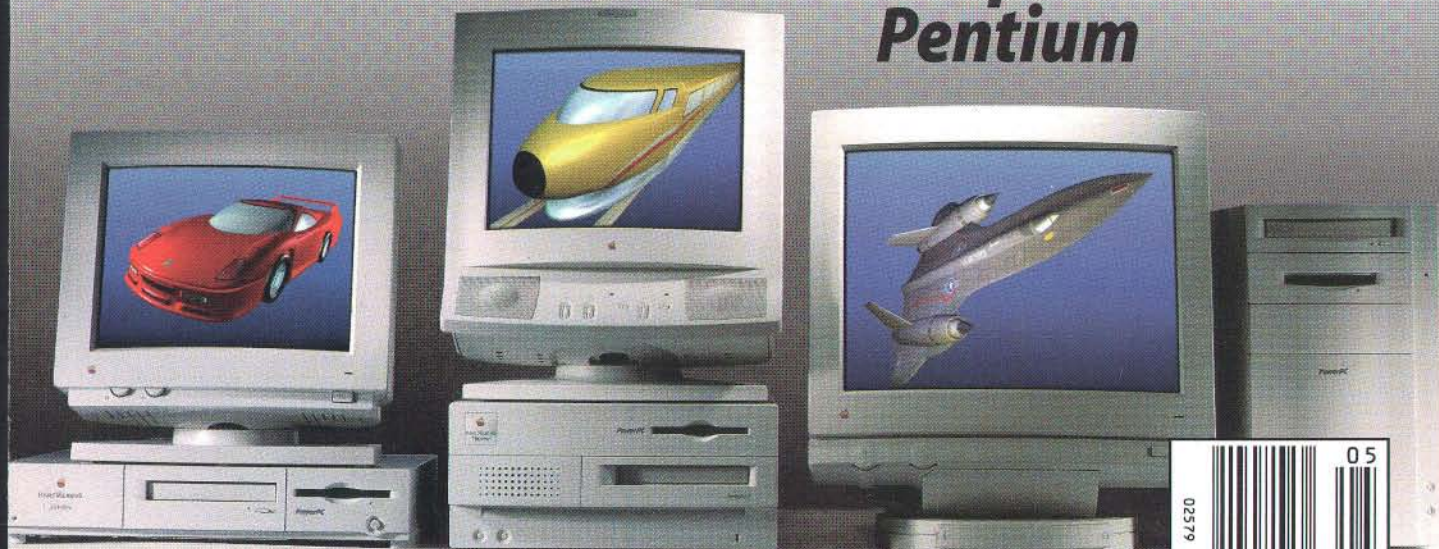
MAY 1994 / \$2.95

MacUser

***FASTEST
EVER!***

PowerPC Macs

- ▶ ***Five Times Faster***
- ▶ ***Works with Windows***
- ▶ ***Outperforms Pentium***



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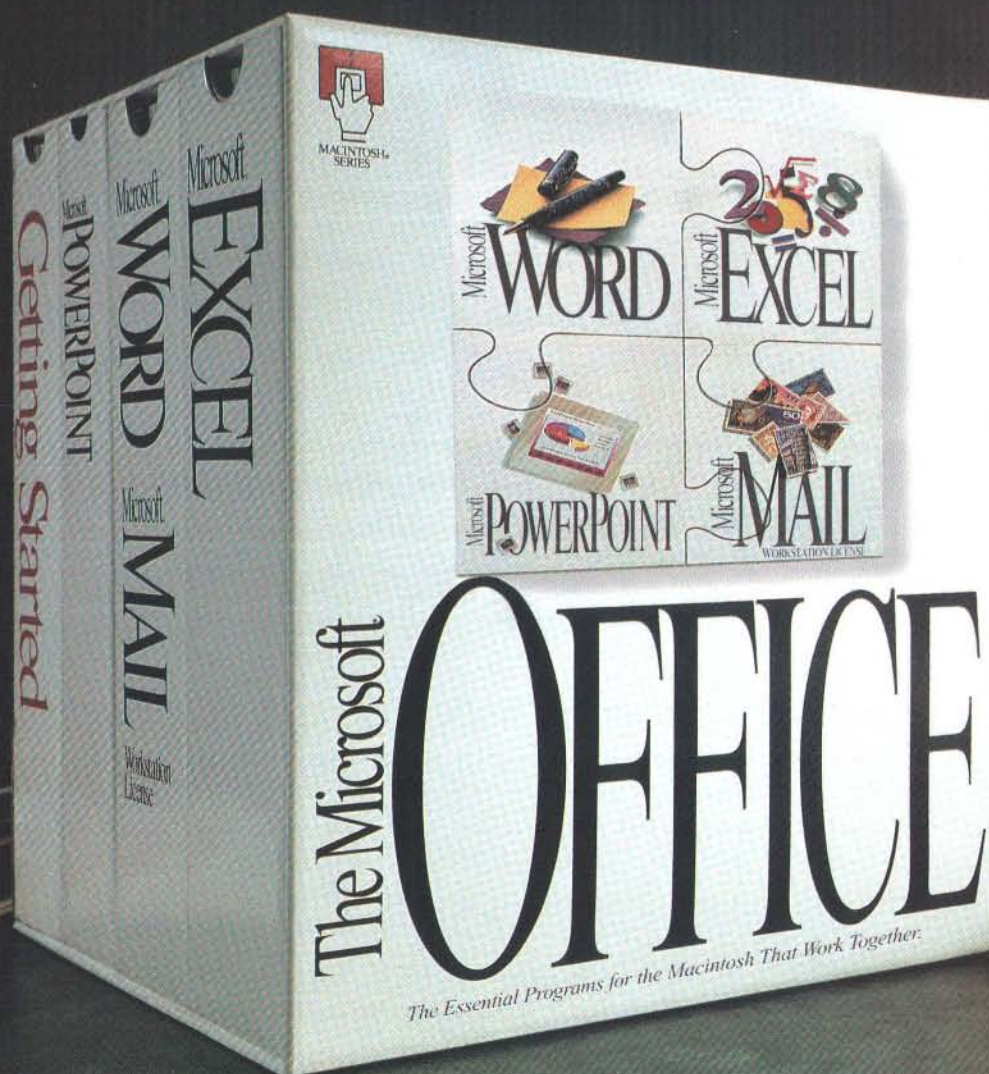
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**SOMETIMES THE BEST DESIGNS
IMITATE NATURE.**



A vertical photograph of a forest. The image is dominated by dark, vertical tree trunks that create a strong sense of depth and rhythm. Sunlight filters through the canopy at the top, creating bright, glowing patches of light and a hazy, ethereal atmosphere. The overall color palette is dark with highlights of green and yellow from the sunlight.

**EVERYTHING HERE IS DESIGNED
TO WORK TOGETHER PERFECTLY.**



MacUser Contents

MAY 1994 / VOLUME 10 NUMBER 5

37 / Newton: New and improved?



NEW ON THE MENU

Newton Slimmer and smarter. / **QuickTime 2.0** TV quality. / **Face to Face** Collaborative computing. / **PowerPC** The first proof of power. / **Premiere 4.0** Whizzy new effects. / **Radius** Monitors of the future. / **Plus** Macintosh price index. / 37

COLUMNS

Maggie Canon The Power Macs are here. / 21

Andy Ihnatko Get rich quick. / 23

Michael Swaine Let's go for the big spin. / 29

John C. Dvorak Get ready for Windows. / 230

Letters / 11

Product Index / 193

Advertiser Index / 196

Marketplace / 200



On the cover / The most powerful Macs Apple has ever released.

Cover photo / GIAMPIERO BENVENUTI



40 / Monitor of the future.

REVIEWS & QUICK CLICKS

4D First ACI US' new entry-level, fully relational database program is easy to set up and use. / 45

Passport Producer Pro This powerful tool for synchronizing video and audio devices now includes controls for setting up interactive presentations. / 48

LANsurveyor This network-troubleshooting program combines the best features of polling, monitoring, and inventory programs under one easy-to-navigate graphical front end. / 50

DayMaker Organizer 3.0 More than just a to-do list, the latest version of this veteran personal information manager links your contacts to your calendar and more. / 52

At Ease and **At Ease for Workgroups** Cheap and easy Finder alternatives let homes and schools — or any other shared-Mac environment — manage file access. / 53

Ready, Set, Go! 6.0 The most recent update adds enhanced trapping controls to its typographic and color-sep controls, making it a solid choice for page-layout designers. / 54

Citizen Notebook Printer II Pint-sized portable printer features color output but won't win any awards for speed. / 58

E-Machines EtherDock Duo owners will appreciate not only the EtherDock's 10BASE-T Ethernet support but also the extras the product provides, including two serial ports, a SCSI port, sound-in and -out connectors, and 8-bit color-video support for many large-screen monitors. / 62

CrossTalk for Macintosh Offering a more comprehensive set of protocols and emulators than its three main competitors, this new entry to Mac telecom deserves a look. / 64

CheckWriter Pro 6.0 You don't have to be a CPA to use this personal-finance program. / 69

SimCity 2000 As mayor of a revamped futuristic city, you face new challenges designed to thwart even the most politically astute. / 69



Thinkin' Things Six learning activities make thinkin' fun for 4-to-8-year-olds — and entertain the child in all of us. / 69

SITcomm On-line communicating is a snap with this telecom program — just click and connect. / 70

CDU (Connectix Desktop Utilities) This collection features keyboard shortcuts, security setups, and file synchronization. / 73



COVER STORY

Power Macs: Full Speed Ahead

MacUser Labs APPLE'S NEW PowerPC-based Macs not only set the standard for performance but they also compete in the real world in terms of price and compatibility. For this special report, MacUser

Labs put the three Power Macs through a battery of tests. Here are the results. BY HENRY BORTMAN, CHERYL ENGLAND, AND STEPHAN SOMOGYI / 76

Upgrades: From Mac to Power Mac

JOIN THE POWERPC PARTY without buying a brand-new Mac. Logic-board and processor upgrades from Apple and third parties give you the speed and functionality of true Power Macs at a significantly lower cost. Here's what's available now and in the future. BY HENRY BORTMAN / 93

Software: The Power and the Promise

NEW SYSTEM SOFTWARE will take you only part of the way toward the warp-speed experience of a Power Mac. You'll also need new "native" versions of your applications — reworked to take full advantage of the high-powered PowerPC 601 processor. Here's a rundown of when your favorite apps are expected to go native. BY HENRY BORTMAN / 96



FEATURES

MacUser Labs Choosing the Right Server

MATCHING SERVER SOFTWARE to your needs is not as straightforward as buying software for your Mac. You need to pick a product that is compatible with your network and includes the features you're looking for. Here's where we can help. BY JULIE BAHER AND SHELLY BRISBIN / 102

MacUser Labs A Printer on Every Desk

GOOD-QUALITY, FAST PRINTING and a price almost anyone can afford. Those are hallmarks of the best of the 19 personal printers we tested. Isn't it time you put a printer on your desk? BY TONY BOJORQUEZ AND RIK MYSLEWSKI / 112



112 / Nineteen printers priced at less than \$1,500.

HANDS ON

DESKTOP PUBLISHING / 125

Graphics How-To You can create on-the-fly illustrations by twiddling with your symbol-font collections. / 126

BRIDGES / 131

Mac to PC Soon-to-be-released technologies, including better Windows compatibility and PCI expansion slots, should make the Power Mac the best cross-platform machine you can buy. / 133

MOBILE OFFICE / 141

PowerBook Tips How to fix a corrupted System file, tame the AC adapter, and silence your startup sound. / 143



141 / Return of the acoustic coupler.

Mobile Mac Plan ahead, get your system disks in order, and avoid those troublesome travel emergencies. / 145

POWER TOOLS / 151

Techniques Get ready for communicating at 28.8 kilobits per second with the new V.fast modem protocol. / 151

Tip Sheet For experts and novices. / 157

Help Folder Andy and Bob answer all of your questions. / 161

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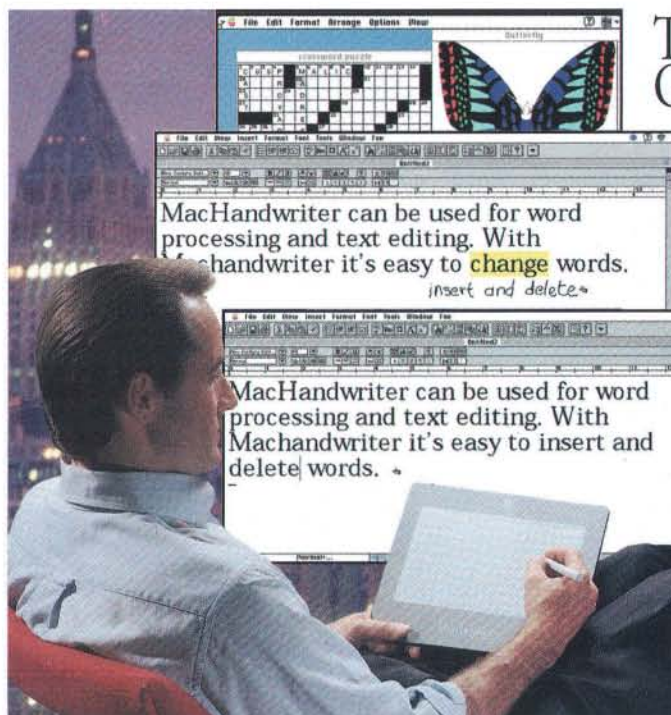
MacHandwriter — the all-in-one input device for entering graphics, text and commands — was named by *MacWeek* as one of MacWorld's "must see" products. More than a mere tablet, MacHandwriter is the perfect keyboard complement. *MacWeek's* Henry Norr wrote in his 1/31/94 front-page article, " ... we were comfortable using the pen as a mouse substitute ... "

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March 1994, PC COMPUTING

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any letter you write will be treated as a command hot-key. You know: Command-Q quits your application; command-S saves it, etc? No more command-key this, command-key that and then switching over to your mouse! Release the button and use the same editing gestures you use on hardcopy, and watch your document accept them in real time. The perfect complement to your keyboard, MacHandwriter lets you ...

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and **Derek van Alstyne** 1967 – 1989

"FirstClass Goes Beyond The Capabilities Of Most Mail Systems"

BYTE Magazine
09/93



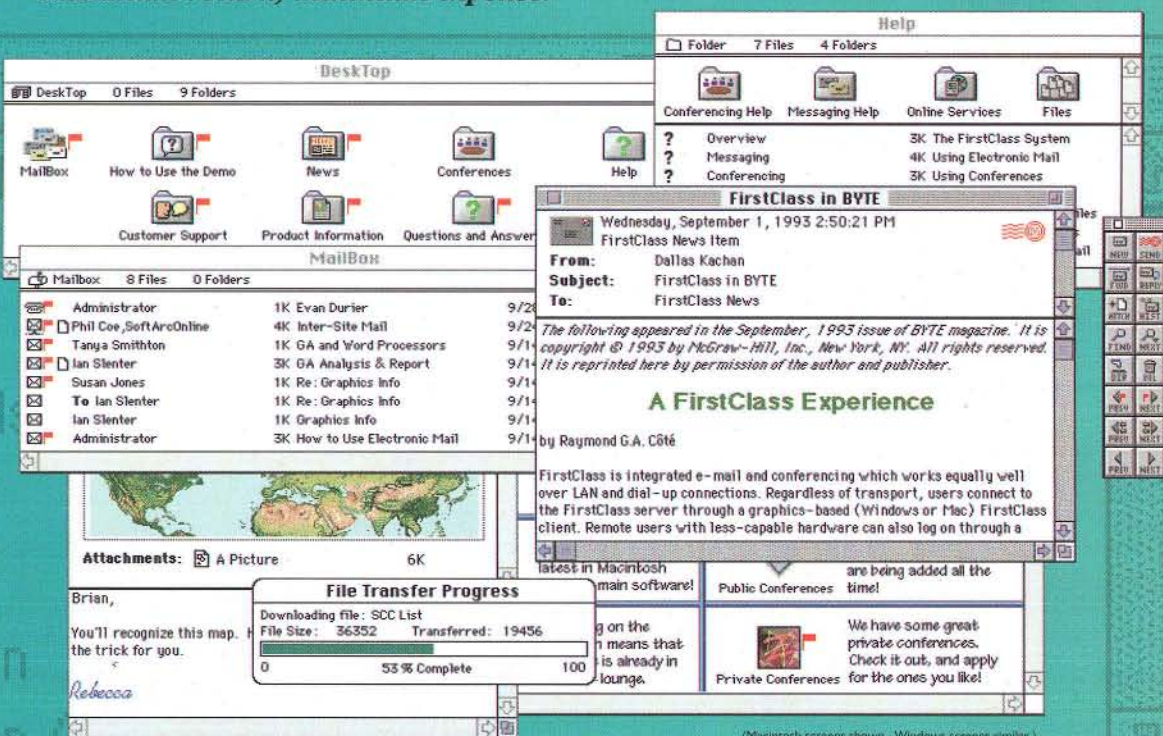
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(Macintosh screens shown. Windows screens similar.)

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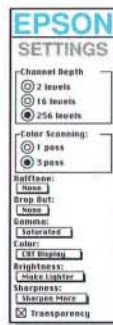
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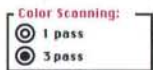
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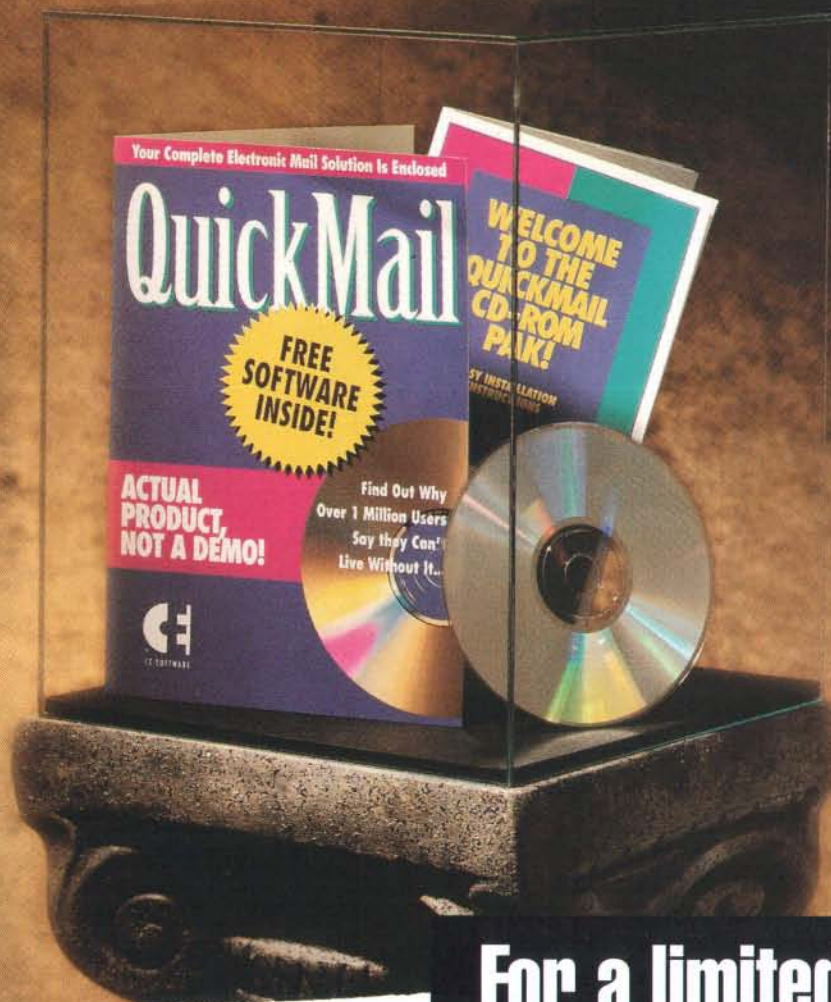


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CE SOFTWARE

LETTERS

Our New Look

I PICKED UP my mail yesterday and thought that some other Mac magazine had come by mistake. But it was no mistake. The February '94 issue of *MacUser* was almost a miracle. What a beeyutiful change! And not only beeyutiful but also practical. The page headings are a great time-saver, and every editorial page looks cleaner and is more pleasant to the eye. Congratulations!

Allen Jamieson
Sacramento, CA

DUE TO SOME grievous error, I apparently received the Windows version of *MacUser* last month. Please correct.

Joe Zeff
via ZiffNet/Mac

CHANGES TO the "old familiar" are seldom welcome. You've really done it this time with the new look. I like it!

Frank Heaton
Everett, WA

I AM A LOYAL, longtime *MacUser* reader who believes the editorial content in your magazine is the best in the industry. But quality content won't do much good if reading your magazine becomes a chore. In the spirit of wanting *MacUser* to succeed, I suggest that you bring back the old format or try again.

Scott Chandler
via the Internet

Write to Letters

c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

To send your letter electronically via MCI Mail, CompuServe, or ZiffNet/Mac (our on-line service), see "How to Reach Us," on page 4. All letters become the property of *MacUser*, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

BRAVO! *MACUSER'S* great new look is just what was needed. I enjoyed the extra news pages and all the extra reviews. I was even impressed that John Dvorak wrote a complimentary column about the Mac. Good job!

Dave Keiser
via ZiffNet/Mac

I DON'T KNOW HOW to tell you this, but here goes:

The articles look like advertisements.
The reviews look like advertisements.
The features look like advertisements.

Even John Dvorak's column looks like an advertisement! (Although I'm not sure what he's selling.)

Bill Moore
via ZiffNet/Mac

I LIKE THE MAGAZINE'S new look. It's fresh, open, and modern. I do have one small suggestion, though, that I think would improve readability. Please, on pages containing both editorial and advertising content, use a bar to separate the two.

Mark Hunn
via the Internet

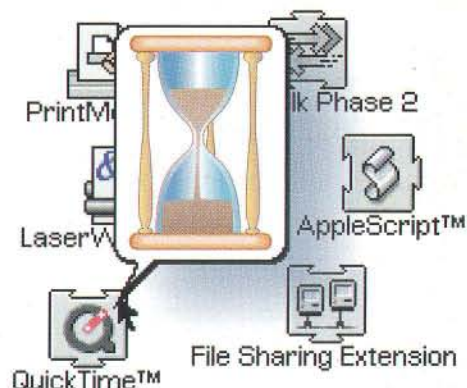
/ Thanks for the input. As you can see, we have reimplemented lines between editorial and advertisements, starting in the March issue. You'll be seeing more tweaks to our new look in the future. / PP

Scant Scanners

WE'VE BEEN STAVING OFF the purchase of a scanner for more than a year, waiting for a definitive test report on the subject, so I turned immediately to "Low-Cost Color Scanners" (February '94, page 129). Cripes, was I disappointed!

The article doesn't mention either of the Hewlett-Packard scanners, which, because of their quality and price, have a major presence in this market niche. And the article is sandwiched between ads for the Relisys RELI 2400DPI and Agfa StudioScan scanners, neither of which is mentioned, much less tested.

Like many of your business-oriented professional readers, I am looking for comprehensive, definitive reviews that *fully* survey each field of equipment. So I urge you to take



OPEN FOLDER

Proving that the Mac still has the power to surprise even the most jaded users, Nick Chaimov, of Milwaukie, Oregon, noticed this Balloon Help bonus: "When I put the pointer over my QuickTime extension, a balloon pops up that says 'Time n. A nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future.' What does this mean? And what does it have to do with my QuickTime extension?" Well, Nick, it means that mousing around with Balloon Help is a waste of time.

This quirk of QuarkXPress surprised Kristina Juneau, of Manotick, Ontario, Canada: "When trying to select text behind a picture box, I held down Shift, Option, and Command and then pressed Delete. To my surprise, a little Martian fellow came walking out in full color, accompanied by sound effects, and proceeded to blast away my line." Maybe the Quark programmers were thinking about PageMaker-developing Aldusians at the time.

Engineers are a precise bunch, it's true. When referring to the power consumption of the Hewlett-Packard 4MP and 4ML, we used the phrase *watts per hour* (February '94, page 51). Electrical engineer William B. Abbott beamed us this correction via ZiffNet/Mac: "The electrical unit watt means the rate at which electrical energy is being used, that is, one volt-ampere per second. Because the rate of time is built in, *watts per hour* is improper." Thanks, Bill, but fellow reader Patrick Chapman sent us his definition of a watt via the Internet: one joule per second. Watts the difference between an ampere and a joule? A newton?

A special note to Thierry Willemsens, of Brussels, Belgium, who sent us an unlabeled disk, a printout of desktop icons, and four color photographs of an Atari Megafile: Huh?

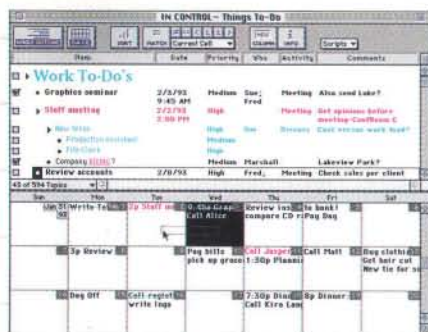
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LETTERS

a fuller editorial swing at this important subject.

Edward B. Stott, President
Air New England, Vineyard Haven, MA

/ It's a matter of too many scanners, too little time. The Agfa StudioScan, the Relisys RELI 2400DPI, and the HP ScanJet IIcx all were announced after we completed our exhaustive testing for the article. Watch for individual reviews of these products. Because we reviewed the HP ScanJet IIc in "Getting the Picture: Color Flatbed Scanners" (May '93, page 106), we didn't include it or other previously reviewed scanners in our story, opting instead to look only at models that had come out since then. We do realize that not everyone has access to our back issues, however, so we'll include relevant information from previous reports in future stories. / MF

I HAVE COME to trust your magazine as an excellent source of hardware reviews. However, the reviews often lack enough information for me to evaluate products that don't receive a "MacUser RECOMMENDS" designation. For example, in "Low-Cost Color Scanners," you show output from only four scanners, in figure 1. Why not show output samples from all the scanners? Often we have only the reviewers' words on which to base our conclusions. More figures showing the results of your tests will help us make more-informed purchase decisions.

Eric D. Dickmann
via ZiffNet/Mac

/ We don't run output samples from all the scanners we test for two major reasons: First, there's never enough space to run samples at a useful size; and second, because the printing process often obliterates subtle differences, it would be virtually impossible to tell many of the samples apart. We include output samples that clearly show distinguishing characteristics. We hope to make samples available on-line so you can judge their quality for yourself — if we can get the file sizes small enough. / MF

Deceleration

AFTER READING MACUSER'S review of 40-megahertz 68040 accelerators (February '94, page 58), I feel our product, the Mobius Speedster AC440f, was incorrectly assessed.

As your article notes, we were unable to supply MacUser with a secondary cache in time for the review. As a result, the Speedster AC440f was the only accelerator card you tested without a secondary cache. According to your article, "on average, a card with a secondary cache increases the Mac's speed

by 30 to 40 percent over a card without one." Yet the accompanying speed chart shows the Speedster AC440f as being 30 percent slower, on average, than the competition, and the summary gives "Smallest speed boost" as our principal con. By the time the article was printed, the secondary cache was shipping, and the Speedster's speed with the cache meets or exceeds that of all competitors' offerings.

Kamran Mohsenin, President
Mobius Technologies, Inc., Emeryville, CA

WordImperfect

IN YOUR FEBRUARY '94 issue (page 54), WordPerfect 3.0 earns the absurd rating of four mice. In its quest to best the feature set of Microsoft Word, WordPerfect has lost sight of what word processing is really about — writing — and the cost to writers is in performance.

On anything other than a 68040 Mac, WordPerfect 3.0 is snail-slow, particularly when you use lots of paragraph styles (if you have a Mac Classic or similar machine, forget it; you may as well go back to your typewriter). Speed is not WordPerfect 3.0's only problem. I've found that a style-rich 120-page document gobbles up an astounding amount of disk space — far more than an identical document created in other word processors.

Because style sheets (more than drawing modules, equation editors, or 3-D buttons) are critical to word processing, WordPerfect 3.0 — a beautiful, feature-packed application — fails as a word processor.

Susan Townsend
via ZiffNet/Mac

Time to Bitch?

IN "PROFESSIONAL PAGE LAYOUT: Time to Switch?" (February '94, page 108), Kathleen Tinkel and Cheryl England chastise Quark for taking "a step backward in version 3.2 by removing the ability to apply master pages via the Document Layout palette. Quark plans to restore this in version 3.3, thanks to user outrage." Actually, those outraged users will have to remain thankful, because version 3.2 *does* have this ability. In the Document Layout palette, select the page icon (or Shift-select a range of them) and then hold down Option and click on the icon of the master page you want to apply. (Quark's manuals are notoriously obtuse,

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Poor Claris. Once again, Canvas™ is running circles around MacDraw® Pro. In fact, they are still trying to catch up to Canvas 3 while we've added dozens of new features and enhancements to create Canvas 3.5. Like 3-D extrusions of text and graphics, enveloping of text and graphics, smart lines, fine kerning, fractals, automatic concentric circles and spirals, and a tool loader that allows you to add tools as you work. There's even a versatile pressure-sensitive freehand Bézier pen tool. And Canvas 3.5 has really outdone itself with new improvements including object blends, binding of text to shapes and curves, Bézier text conversions, and macro windows. Which is just the beginning, because Canvas also includes all the great features of 3.0 like custom parallel lines and curves, our unique SmartMouse™, and more. Comparing Canvas to the competition is like comparing a superbike to a tricycle. And only Canvas is self-upgrading, allowing you to add new tools, effects and file translators at will. Last but not least, while MacDraw Pro is idling somewhere back in the Dark Ages, Canvas features seamless file sharing with its recently released Windows version. Add it all up, and it's

CANVAS 3.5

easy to see that it's time to shift gears to ultimate in value and performance, Canvas of your life. So go ahead and hop on.

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MACWORLD
AUSTRALIA, 1992



MACWEEK
DIAMOND AWARD, JAN '93



SYM MAC
1992



MACWORLD
SEPT 1993



MACUSER
MAR '90, MAR '92



MACWORLD
1993



MACUSER
APRIL '90, JAN '92



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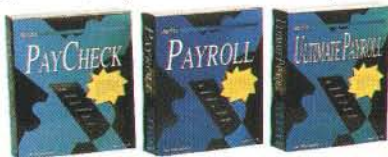
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CIRCLE 48 ON READER SERVICE CARD

LETTERS

but this time it really *is* in there.)

**Jim Williams
via the Internet**

/ You can still apply styles from the Document Layout palette in QuarkXPress 3.2 but not as easily as in the past (or in 3.3). Dragging one icon over the other was fast, elegant, and transparent. Having to select a page or pages and then press Option and click on a master-page icon is a kludge. / KT

"PROFESSIONAL PAGE LAYOUT: Time to Switch?" brings to mind Apple's lemmings ad for the Mac. Everyone uses either PageMaker or QuarkXPress, so for the last four or five years, almost every review of DTP focuses on PageMaker and QuarkXPress. Or is it that every review is on PageMaker or QuarkXPress so everyone follows along?

Never once in your publication have you given Ready,Set,Go! its just due or had a comprehensive and fair evaluation of final output from the DTP packages. What about one-step separations, type and image control, color fidelity, dot specs and film size, RAM requirements, and speed, for example? PageMaker and QuarkXPress *cannot* do RGB TIFF separations without add-ons — Ready,Set,Go! can. Features such as tracking tables, font-conflict elimination, rotation in 1-degree increments, word processing, spell checking, and color separation were in Ready,Set,Go! versions ago, but you never mention it. I'll take innovative software that does almost everything imaginable well for a street price of \$290 over one that costs \$589 plus extensions any day.

**Dean A. Spahr
Pittsburgh, PA**

/ Ready,Set,Go! has some enviable functions, which is why we did include it in the page-layout story and why we review it in this issue. But it isn't equivalent to QuarkXPress and Aldus PageMaker in a real-world comparison. It's not cross-platform, and although it has a wonderful separation facility, it's hard to find an output service that keeps Ready,Set,Go! on hand. Above all, the shipping version we tested crashed too often. Ready,Set,Go! was once my tool of choice, and I have a lingering fondness for it. The current developer understands typography and the graphic arts and, given time and money, should make Ready,Set,Go! a contender again. / KT

We've Been Terminated

THANK YOU FOR your December article "Installing an Internal Hard Drive" (page 197). I concur that the process of installing a

hard drive is generally simple to do in our modular Macs. I would like to add the following, however:

If users perform this task, it may void their Apple limited warranty.

To the best of my knowledge, Apple does not use, and has never used, aluminum-wire SCSI ribbon cables. Our specification requires the wire to be copper with tin plating to prevent corrosion, and I have verified that copper wire *is* used. I cannot agree with your recommendation to replace the SCSI ribbon cable. Apple's power cables, because they use a heavier-gauge copper wire, are equal in quality to SCSI ribbon cable.

One major consideration that was overlooked in the article is SCSI termination. It is imperative that the SCSI chain be terminated properly at both ends. The last internal SCSI device on the ribbon cable should be terminated, unless the cable itself provides the termination (as with the Quadra 950). With the Centris 650 you show, the hard drive should be terminated. However, your picture of the hard-drive controller board clearly shows that there are no resistor packs installed on this hard drive.

**Bryan Longmire
Apple Computer, Inc., Cupertino, CA**

/ For the record, we did note that this do-it-yourself approach invalidates the warranty. The photograph on page 198 was intended to show how to set SCSI ID, but you raise a valuable point about termination. For more information about hard-drive termination, read "The Hard Truth" (March '94, page 97). / NP

Shareware Solution

SHAREWARE DISTRIBUTION isn't limited to CD-ROMs and on-line services. Have you forgotten about floppy disks? One of your readers, Tony Hauth (Letters, February '94, page 16), asked how he could obtain shareware without a modem, and your answer was that he had to buy a modem or a CD-ROM drive! Not true! The Boston Computer Society and BMUG, two of the sources for shareware CD-ROMs you mentioned, also distribute their shareware on floppy disks.

**Amy Rothstein
via the Internet**

WHY DO YOU ADVISE your readers to shell out at least \$150 (frequently more) for a CD-ROM drive, when they could do one or more



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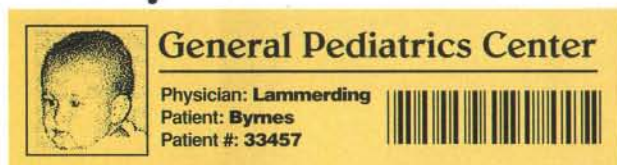


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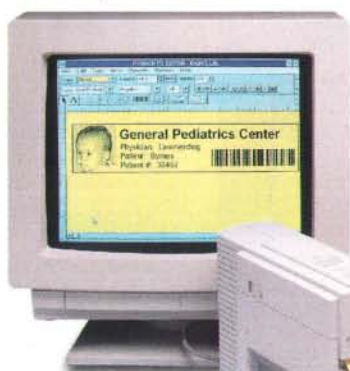


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CIRCLE 98 ON READER SERVICE CARD

LETTERS

of the following things instead:

- Ask a friend for the shareware program.
- Join a user group (and make new friends).
- Buy a floppy disk containing the shareware from one of several sources such as Educorp.

As an aside, did you mention that the price of a CD-ROM drive would be more than paying for a 2,400-bps modem and one year of basic on-line fees?

Michael Witman
via the Internet

/ Thanks for the information. But considering the wealth of software and information available on-line, I still think a modem is a good investment. No sales pitch, just advice. / PP

Put Out About Output

I RECOGNIZE THAT JOHN DVORAK is supposed to produce outrageous statements from time to time. That's a considerable portion of what he gets paid for, I imagine. But ridiculous ones? He says, "For anything fancier than text generation, I prefer the Mac. The output is superior to everything else — including that of the best Windows machine" ("The Front-Page Debate," February '94, page 278).

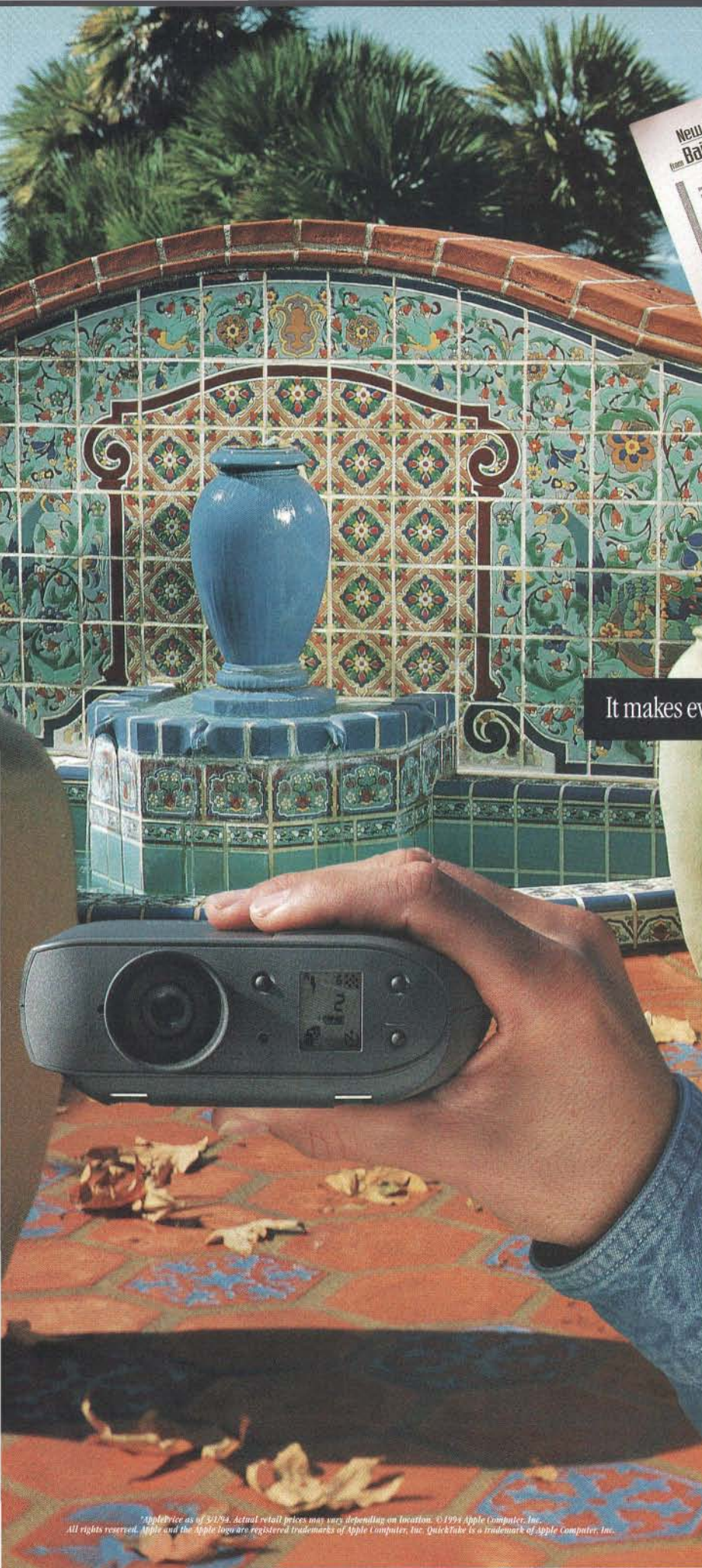
Surely output depends on more than the platform alone. It also depends on user choices and the software, fonts, printer, and paper used. A Macintosh is doomed to produce lousy output if it has lousy fonts and a lousy printer. By the same token, so is a Windows machine. Have I missed something? Is there some tangible blessing that's automatically conferred upon Macintosh output that is not available to Windows/DOS/OS/2/NeXT/UNIX users?

Martin LaBar
Liberty, SC

What Does Restart Do?

TIP SHEET IS ONE of my favorite sections of *MacUser*. I always like to find out something new and potentially useful. The February '94 Tip Sheet (page 193) was really underwhelming, though. Did you actually pay somebody \$25 to tell you that if you select Put Away from the File menu, it puts something away?

OK, then, here's my tip, and I think it should be Tip of the Month: You can select an icon and choose Open from the File menu and — presto! — it opens the document



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LETTERS

with the application that created it.

Michael Gibbs
via the Internet

Master of Its Domain

I HAVE TO DISAGREE with the four-and-a-half-mouse rating of the Hewlett-Packard LaserJet 4MP printer (February '94, page 51). I think it deserves five mice. How many of your readers are just going to skip to the punch line and read this:

"PROS: Top-notch output. Affordable price. Compact design."

"CONS: Slight paper curling."

That's a major drawback! I felt like I was watching *Seinfeld* and Elaine just scrunched her nose, with Jerry nodding in agreement.

For the record, when I put a LaserJet 4MP on my desk and plugged it in, the printer never strayed or slid from its position and never came unplugged. It does run out of paper every now and then, though.

Jeff Bierly
via ZiffNet/Mac

DOS Doesn't Mean Dunce

IS THERE ANYTHING you can do about your fanatic editorial bias against DOS? In the February '94 issue, you start off with "Windows on *Beavis and Butt-head*?" (Open Folder, page 13) and continue with "you've got to edit your WIN.INI file. Let's stop and look at reality for just a minute" ("That Giant Sucking Sound," page 33).

The real secret to using computers is: Don't limit yourself. Use the right tool for the job. Start by learning the operation of all models — including those dreaded DOS machines — on the market. Macintosh problems are as numerous as DOS ones, you know.

I'm an intelligent computer user, and I don't appreciate being portrayed as a dunce in your magazine because I use DOS.

Christopher Gordon
Ventura, CA

/ So what have you got against Beavis and Butt-head, anyway? / PP

CORRECTIONS

In the story "In Search of the Safest Monitor" (February '94, page 92), the Sony CPD-1730 and CPD-1604S 17" monitors should have been listed as using antiglare treatments. Both products also include a one-year warranty on parts and labor.

Twice As Fast

Cropped section of drawing by Joe Webb created in PowerDraw

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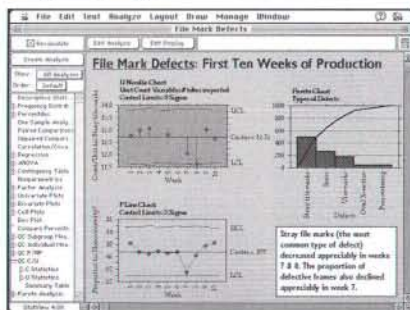
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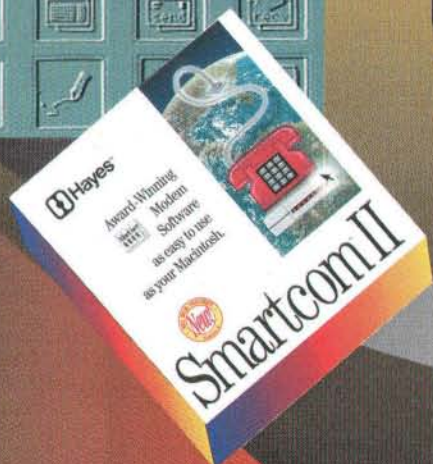
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CIRCLE 61 ON READER SERVICE CARD

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Asanté now takes Ethernet all the way to your laser printer.

The proven leader in Macintosh® networking now offers more Ethernet® solutions than ever. Introducing AsantéPrint™, the simplest way to connect up to 8 LocalTalk™ laser printers or other devices directly to a high-speed Ethernet network.

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AsantéPrint has no switches to set or installation software to load, so it works right out of the box. And, unlike other converters of its kind, AsantéPrint has no necessary power-up sequence. Because of this, it's the only EtherTalk-to-LocalTalk converter that is capable of unattended recovery after a power outage.

AsantéPrint is so simple, it's perfect for small networks. It's also ideal for more sophisticated networks when combined with AsantéPrint management software. This combination offers you management and security features which provide an unparalleled level of control over all your Ethernet and LocalTalk connections.

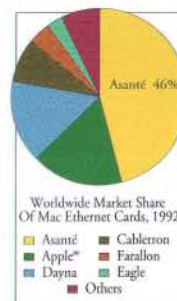
The security software assigns passwords to any or all of your connected LocalTalk devices, and even allows you to specify passwords for specific LocalTalk classes such as color printers or dial-out modems. So you can protect peripherals from unauthorized or accidental access.

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Asanté™ has a reputation for producing compatible, reliable networking products. We offer a full family of best-selling Ethernet and Token Ring® adapter cards for PCs and Macs®. And a full line of intelligent and non-intelligent 10BaseT hubs. Now we're taking Ethernet all the way to your laser printer.

AsantéPrint. The latest innovation in Ethernet solutions from the company with all the right connections.

Resellers: Asanté products are available from Ingram Micro, Merisel, Tech Data and Gates/FA.



Source: InfoCorp



Meet the Power Macs

TO BUY OR NOT TO BUY: THAT IS the question on many Mac users' minds these days. After months

of anticipation, the new Power Macs are finally for real. Now you must decide whether you should purchase one of the new Macs, opt for a Power Mac upgrade, or stick with a 680x0 Mac for now.

To help you with this decision, *MacUser* put the new Power Mac 6100/60, 7100/66, and 8100/80 through an exhaustive battery of tests (our editors are still trying to catch their breath!). We wanted to determine how fast Power Macs perform on a variety of real-life tasks as well as how much raw power they offer compared to their fellow 680x0 Macs and rival 486- and Pentium-based PCs. Here's a brief rundown of what we found.

Our MacBench suite of subsystem-level benchmark tests showed that the Power Macs provide considerably more processing power, particularly on floating-point operations. The Power Mac 6100/60 was twice as fast as the Quadra 840AV on the processor test and the Power Mac 8100/80 was a whopping nine and half times as fast as the Quadra 840AV on the floating-point test.

We also tested a variety of prerelease "native" applications on Power Macs. Although the gains weren't as impressive for business applications, the Power Macs really shone in the publishing and image-processing categories. They were especially impressive in number-crunching and rendering applications, with the Power Mac 6100/60 edging out the Quadra 840AV and the Power Mac 8100/80 running 60 percent faster than the Quadra 840AV running 680x0 applications. In addition, we tested more than 30 third-party 680x0 system extensions to see whether they slowed the Power Macs down. Only a handful caused a serious slowdown (and they should be receiving maintenance

updates soon after the Power Macs ship, to remedy the problem).

But what about your current software investment? Apple spent a lot of time making sure your current software would be able to run under emulation on the Power Macs. Our testing found the emulator to be solid if not snappy. Current 680x0 software will run at speeds that are acceptable for most users.

Of particular interest to people considering jumping the fence from the Intel world, the Power Macs outperformed Pentium as well as 486 PCs when running typical business, publishing, and rendering tasks. And if you need to run Windows, you can purchase any of the Power Macs in a configuration that includes SoftWindows, which allows most DOS and Windows software to run at lower-end-486 speeds.

The number of software applications that have gone native and will be ready at launch is a little disappointing. Microsoft Word, Microsoft Excel, and Adobe Photoshop are a few of the more popular applications that aren't ready yet. Look for them sometime this summer. On the other hand, products such as WordPerfect 3.0, MacroModel, StudioPro, Infini-D, Great Plains Dynamics, PainterX2, DeltaGraph Pro 3, Retrospect Remote, VideoFusion, and ClarisWorks were expected to be available when the Power Macs shipped. And favorites such as Aldus PageMaker, Adobe Illustrator, FrameMaker, QuarkXPress, and


Kai's Power Tools will be available shortly after the Power Mac rollout. Check out our chart on page 98 for a comprehensive list of vendors' plans.

So, should you buy a Power Mac? That depends on your situation. If you're in charge of a large installation of Macs, you should consider a combination approach. A mix of Power Macs and 680x0 Macs with PowerPC upgrades from Apple and/or Day-

Star Digital hedges your bets and protects your budget.

If you're ready to buy a new computer, you can't go wrong with any of these new Macs. For those of you who are pushing the limits of a high-end Mac and find yourself going on vacation while you wait for images to render, take the plunge and

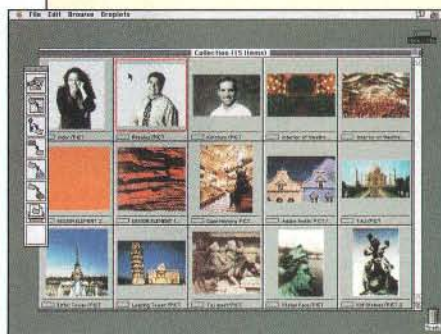
buy an 8100/80. If you run mainly Microsoft applications, you might want to hold off until the native versions are shipping and then buy a 6100/60 or 7100/66. If you're buying your first computer and plan to use it in your business, you'll find the 6100/60 an excellent buy. If you're buying a Mac for your home, to run Quicken and some education applications, I would recommend a Quadra 605, a Performa, or an LC. You can always upgrade it later if you lust after more power. See "Upgrades: From Mac to Power Mac," page 93, for a rundown on 680x0-upgrade options.

The transition to the Power Macs looks to be a pretty smooth ride. Sure, there'll be some bumps along the way, but as always, we'll be testing the new products and applications and recommending which (and when) to buy. 

*The Power Macs
outperformed Pentium
as well as 486 PCs
when running typical
business, publishing,
and rendering tasks.*

A simple demonstration of PhotoFlash software.

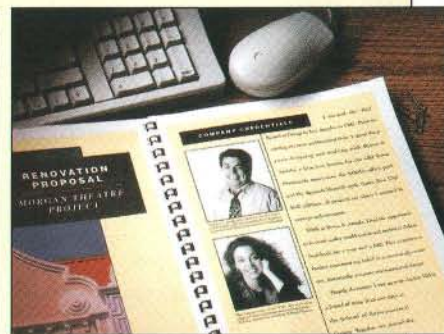
(A complicated demonstration isn't possible.)



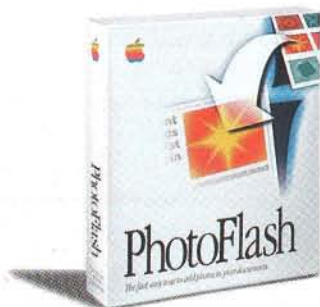
1. Find a photo. The PhotoFlash Brouser makes it easy to view and pick a photo — they're all stored here, whether you got them from a CD, scanner or digital camera.



2. Enhance it. Crop, rotate and resize a picture with easy-to-use tools. Dust and scratch removal is automated, too. You can instantly preview adjustments you've made.



3. Place it. With a point and click, PhotoFlash automatically places the picture in your work. You can also record and automate the tasks you do most often.



You used to have to learn a lot — and spend a lot — before you could work with photos on your computer. Now there's PhotoFlash.™ PhotoFlash is easy to use, right out of the box. It helps you organize pictures, enhance them and drop them into your work. It's fast. It's memory efficient. And it's just \$279.* So if you want to make your work look great, get PhotoFlash. You'll get the picture right away.

Introducing PhotoFlash software from Apple.





No Money Down

NOT SINCE MY WEBELOS DAYS

have I witnessed anything like the throat-tightening pageantry

of the *MacUser* Double-Sawbuck Ceremony commemorating a columnist's (mine, in this case) 20th outing. It's an important ceremony, in that a light sorbet is served with dinner and, on top of that, the columnist receives two important gifts: the traditional saber, sash, and regimental toque of office, which I am now honored to wear at all editorial meetings, and more important, the right to make broad, sweeping pronouncements about Where the Industry Is Going Wrong.

So to accommodate my desire to exercise some newfound power and to show my appreciation for those many readers who've never whacked me in the head with anything for these many months, I present these Five Surefire Easy Ways to Make a Million Dollars in the Software Industry. Or if you've already made the first million clams, ways to easily make the second. And you don't even have to go to a Holiday Inn function room!

Lighten Up. This involves two simple steps. Step 1: Make \$999,980 in the software industry. Step 2: Sell off all those old LPs you've got cluttering your closets. I mean, be honest: Even if your turntable still worked, would you ever want to hear that Journey album again? And that copy of *Hooked on Classics II* — you didn't even know you still *had* that one, did you?

If this doesn't put you over the million-dollar mark, look around the house for any deposit cans or bottles you've been meaning to return.

Think Small. Remember the days when a 400K floppy disk could hold your system software, a word processor, a drawing program, and a pile of documents? Sure, today's apps are much more sophisticated than MacWrite and MacPaint, but as a software

publisher, can you really look me in the eye and tell me you can't write a decent word-processing program that requires less than 4 megabytes of memory and 8 megabytes of disk space? Integrated packages such as ClarisWorks pack a lot of features for the modest system resources they require, but what about the small company that just needs a terribly simple database program for its six Macs and can't afford to pay \$300 a pop? Or a school teaching basic word processing in a 15-Mac lab? Or heck, even absurdly wealthy Mac users who want to have a halfway decent spreadsheet available for use as a scratch pad but who have only 400K of free memory to tuck it into?

There's a big hole in every single software catalog on the planet, and it's smack-dab in the sub-\$100 price category. If my mail and my discussions with other users can be believed, the Mac community is waiting for professionally produced and marketed, lightweight, inexpensive productivity applications to hit the market. Want to make a million bucks (well, OK, possibly less)? Write and publish them.

And what of the guy who's perfectly happy with his LC II, except when he tries to run the latest version of PageMaker or Illustrator? For many people with more-lightweight needs, PageMaker 4.2 and Illustrator 3.2 are still perfectly useful applications that work nice and peppily on older machines. What's more, if you take them on the road in your

PowerBook, they use up a lot less space on the hard disk than do their most recent incarnations while for the most part providing file compatibility. If marketing and maintaining older versions of commercial software is prohibitively expensive, why not allow people to purchase the old stuff on an "as is" basis, at a reduced rate? Call it

a competitive downgrade, and the world will beat the proverbial path to the proverbial portal.

Interzaptive TV. Here's a surefire method for reaping a cash bonanza from the upcoming interactive-TV marketplace. Step 1: Find a person who has invested heavily in an I-TV corporation. Step 2: Ask that person to give you two tens for a five. Step 3: Find another I-TV investor, and repeat steps 1 and 2. The large number of in-

vestors in this particular industry and their extreme gullibility ensures this scheme's success.

If you want to succeed in I-TV yourself, provide home consumers with interactive services they really *want* in their homes. The advantages of paying an extra 30 bucks a month for the ability to watch *Suburban Commando* at any time of the day or night are nebulous at best, but tell American consumers that the new red button on their TV remotes will activate electrodes wired into the clothing of any celebrity within the crosshairs of their new I-TV sets, and it's like printing money!

Copy Defection. Statement the Firste: Software piracy is a serious problem that, in 99.44 percent of all cases, simply should not be tolerated.

Statement the Seconde, the Reale Pointe:

PROBLEM:

You're about a million bucks short of your retirement goal.

SOLUTION:

Enrich yourself — and the entire Mac community to boot.

In my opinion, a software company that incorporates aggressive copy protection into its wares — protection that might prevent legal use of the software under the spirit of its licensing agreement — will inevitably engender bad faith, disgruntled customers, a loss of sales, and quite possibly an increase in piracy. Space constraints preclude me from telling some of the more lavish tales

I've heard about angst suffered by users and retribution inflicted on publishers because of bad copy protection. Suffice it to say, if you copied an essential, legally bought application onto your PowerBook for a road trip, only to find at your hotel that the app refused to run because it wasn't on its "home" Mac, would you then be inspired to continue to give that app's publisher your business? Or,


like a certain Reader X, would you be inspired to take revenge by distributing as many bootleg copies of the software as your Mac could crank out?

Now obviously, Reader X committed a major no-no there, but let's not leave the publisher blameless; it set itself and its user up for a major fall by incorporating a totally wonked-up copy-protection system. Any scheme that doesn't allow users to follow the "one user" spirit of most licensing agreements just has no place in the '90s. Look to Adobe for a positive example: Most of its products merely check your network to see if there's another copy running that has the same serial number. Totally unobtrusive, and the only people who won't be able to use the product are those who are trying to use it illegally.

Except on certain savagely expensive vertical-market applications, intrusive copy protection is a dinosaur that we'd be well rid of and that should *not* be accepted by legal, God-fearing-or-otherwise Americans as the cost of doing business. If you want to make a pile of dough with your commercial application, it's better to leave the software unprotected and risk loss of revenue than it is to risk crippling your users and making that revenue loss a dead certainty.

Quantum Geek. Steps 1 through 3: Develop a workable theoretical model for practical time travel; solve a myriad of high-intractable associated engineering problems; design and construct a working time machine. Step 4: Time-travel back to Seattle, early 1976, and snitch to Bill Gates' mom that he's thinking of dropping out of Harvard. Step 5: With Microsoft out of the picture, move forward to October 1980, purchase the rights to QDOS from Seattle Computer Products, secure a contract from IBM to adapt it to that company's new PC, and make a fortune.

Limited Warranty

No kiddin', folks: I have right here documented evidence (I'm holding up a file folder clearly marked "Documented Evidence") that each and every one of these little gold mines will indeed work — or could work, in theory. What with this month's ceremony and everything, I really didn't have the time to give each gold mine quite the technical shakedown it may have required, so just go in with low expectations, won't you? 



MOVE OVER SAM.[®] VIREX[®] IS NOW 36 TIMES FASTER!^{*}

The problem with anti-virus software is that it slows down your Macintosh. Every time you start your computer, run a program or insert a disk, you spend way too much time waiting. After all, you spent a lot of money for a FAST Mac, right?

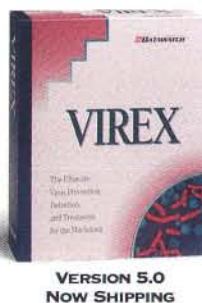
Virex 5.0 solves this problem with new SpeedScan[™] technology that enables Virex to scan, detect and eliminate viruses with blinding speed. With SpeedScan, Virex 5.0 does in 10 seconds what SAM[†]

needs over 6 minutes to do. Yes, seconds, not minutes.

Of course, along with that you get anti-virus software that's the easiest to install, the simplest to use, and the most effective against viruses. And you automatically receive your

first Virex upgrade on disk absolutely FREE.

Ask your retailer for Virex, or call us for more information on our volume purchasing programs. Because once you put Virex to the test, it'll be time for SAM to hit the road.



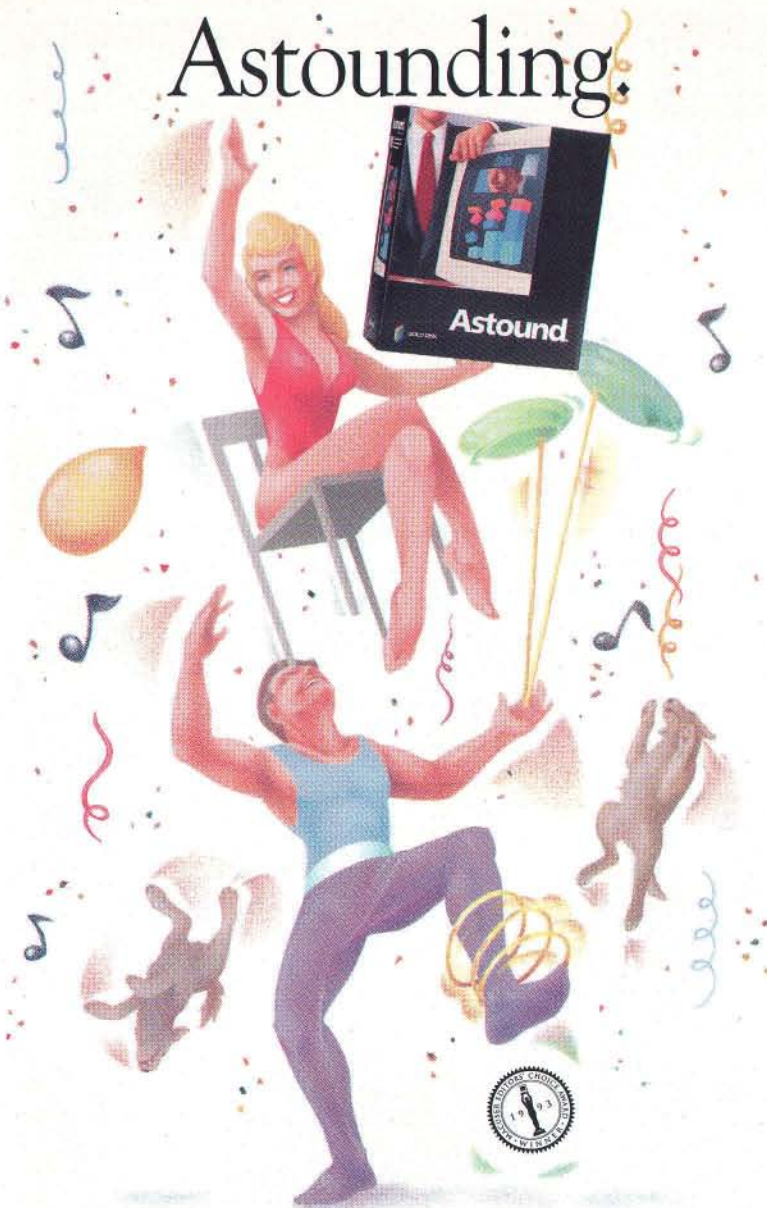
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*In a head-to-head test conducted on a Macintosh IIcx, scanning 79 megabytes of files (1,571 files) on a 230 MB hard drive. Results may vary but, in all tests, Virex was dramatically faster. †SAM is a registered trademark of Symantec Corp.

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Not.



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| Full static presentation capabilities including slides, speaker notes, handouts, and outlines | Yes | Yes |
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| Timelines for precise control of multimedia events | Yes | Not |
| Animated pictographs and charts that grow, tumble, and more | Yes | Not |
| Multimedia effects built into templates | Yes | Not |
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| QuickTime and sound editors included | Yes | Not |
| Can play multiple transitions concurrently | Yes | Not |
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MAC USER MAGAZINE

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Code MU494

For more information, call 1-800-NEC-INFO. Or,
for information via fax, 1-800-366-0476, and request
document #79640. Thank you. And you. And you.

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NEC

CIRCLE 116 ON READER SERVICE CARD

IT'S GONE. AND YOU DIDN'T BACK IT UP.

FACE IT. YOU NEED to back up your files. Use Retrospect, the number one Macintosh backup software — backing up over one million Macs, at last count.

Dragging important files to floppy disks is not backing up. If you crash you'll be retyping and trying to recover files for days. And then still

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searching for what's missing months later. And what if there's a fire, theft, flood, or equipment breakdown?

With Retrospect from Dantz you'll be backing up to the storage device of your choice in seconds — including SyQuest, Optical, Bernoulli, floppies, and file servers. And just about any Macintosh tape drive you choose.



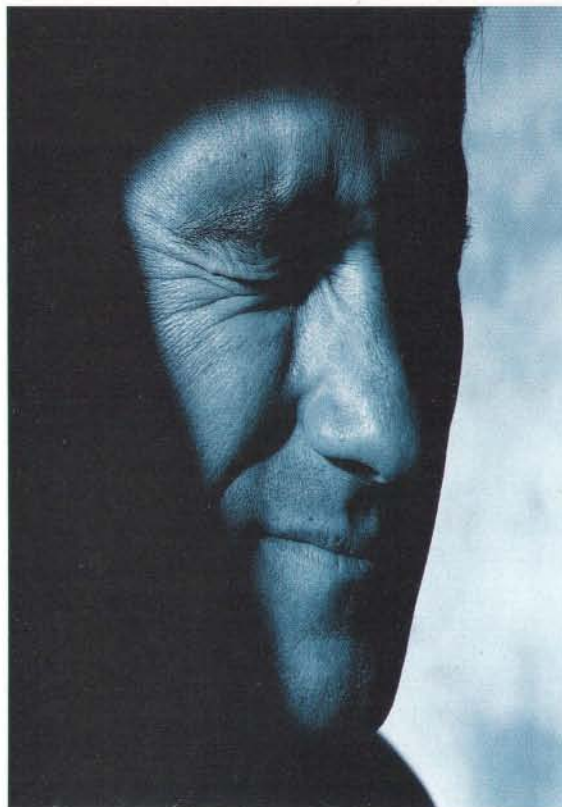
Retrospect packs more power than all the others put together.

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Simply point and click to create a script, then schedule it to run days, nights, or weekends.

WORLD CLASS RESTORING. Every preference file, document, application, control panel, extension and font is returned to its exact location. You won't miss a beat.

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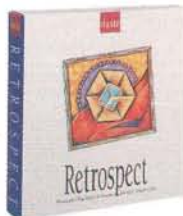


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TOP INDUSTRY AWARDS. Don't just take our word for it. Listen to what experts say about Retrospect: "Retrospect has no equal." *MacWeek*, Diamond Award. "For backing up and archiving, there's nothing better." *Macworld*. And Retrospect Remote is a *MacUser* 1993 Editor's Choice Award winner.

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A Spin-Spin Situation

PRESIDENT CLINTON SOUNDED like an old Mac commercial as he held the slim pamphlet between

thumb and forefinger to show how uncomplicated the federal budget was. "User friendly," he called it. I half expected a handcart loaded with 27 volumes of the Republican Alternative to be wheeled in. But in truth, the slim volume was just a simplified version of the full budget documentation.

Apple seems to be putting an equally simplistic spin on its introduction of the Power Macintosh. I wonder if that's wise.

Think about it. Apple makes the brave leap to a new processor, announces plans to migrate to a different bus architecture, and rewrites key components of its operating system — an undertaking roughly comparable to writing the U.S. federal budget. And how does it label the fruit of all this labor?

"It's a Macintosh."

Meanwhile, truckloads of appendixes are being unloaded at the back door and the loyal opposition is winding up its spin doctors.

I think it behooves Apple to crank up its own spinsters. As all pool players and politicians know, you use different English for different pockets. ("Senator, I believe your interpretation assumes real dollars. Our proposal is based on fantasy dollars.") Here are some twists Apple can — and I think should — apply to the Power Mac story:

1. It's an entirely new platform. If Apple expects to gain significant market share, and it does, it will have to attract Windows users. "It's a Macintosh" is the last thing Apple should say to those potential converts. If superior technology; greater usability; simpler networking; and, recently, comparable pricing haven't coaxed them out from under the Microsoft blanket, then nothing will.

So let 'em have Windows.

But even Windows users are smart

enough to realize that Windows running on a Mac is a kludge and a crock. Apple has to get across that this new machine is not a Mac but a revolutionary new platform that runs either Windows or the Mac operating system, without preference or prejudice. Apple's machines must be seen as a straight, bump-free upgrade path for Windows users.

That's the only way Apple might conceivably lure anyone out of the Windows seat, but it won't work at all unless SoftWindows is bundled with every Power Mac. Otherwise, to Windows users, it is just a Macintosh.

2. It's a workstation.

That's the message to send to users of workstations, the relatively expensive machines from Sun Microsystems and Silicon Graphics, among others.

Workstation users are people who process video or 2-D or 3-D graphic images or perform math-intensive operations. In other words, they're just the kinds of users who make demanding use of floating-point math. And fast floating-point math is the main advantage the Power Mac's PowerPC processor has over its most serious competitor, the Intel Pentium. If these people would consider replacing their expensive workstations with \$2,000-to-\$4,000 personal computers, the Power Mac ought to be their baby.

Early indications are that they will consider it. In the words of David Smith of Virtus, whose Virtus Walkthrough is a Macintosh-based, math-intensive product, "Our customers wanted us to move to

Silicon Graphics. Now there's no need to."

3. It's a Macintosh. That, of course, is the official line, the story for the party faithful, and it's perfectly true. Or at least there's very little spin on the pitch. Apple programmers have crunched code to make this box walk like a Mac and talk like a Mac. Considering that this protects Mac users' investment in software, peripherals, and training, I'd say that was darned nice of them.

This last one is my favorite spin. Warn-

ing: There's some serious torque on this one. Don't move your head as you read it, or you might get dizzy.

4. It's an investment in reverse obsolescence. Do you remember the Mac IIvx brouhaha? How, a few months after releasing the IIvx, Apple made it obso-

lete by coming out with a machine that was better and cost less?

The first Power Macs make up for the IIvx. They embody reverse obsolescence. What I mean by that is that they will get faster as time goes on, because Apple will continue rewriting operating-system components for the PowerPC chip and third-party vendors will continue taking their applications native. The former will speed up applications you already own. The latter will mean faster new versions of applications. There's a good chance that some applications will get sped up twice, as their vendors first port to the PowerPC and when they later learn to optimize their code for it.

Result? Your Power Mac gets more useful with time. Reverse obsolescence.

Of course, this claim needs to be corrected for inflation. ☞

*Sure, Power Macs are
Macs — but that
doesn't mean Apple
would be smart to sell
them only that way.*

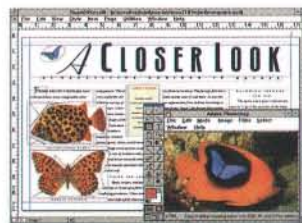


It's time to stop



You've reached a crossroads in computer technology. A point where choosing between a PowerPC* or a Pentium™ processor-based PC could be a difficult decision.

The PC is not what it used to be. Everything you want to do on a Macintosh*, you can just as easily do on a PC. And now, all of the most popular Mac applications are available for PCs, including those by Aldus, Microsoft, Adobe, Quark and Broderbund.



This is a document created on an Intel-based PC.



This is a document created on a Macintosh.

With Windows*, they're just as easy to use. And they run at incredible speeds. To put it in



and ask directions.

perspective, Intel486™ DX2 processor-based PCs outperform the Mac Quadra® 840av, and Pentium processor-based PCs are even faster.

Best of all, you have a choice of over 100 computer vendors who now offer Pentium processor-based PCs.

These PCs give you access to some of the world's most innovative technologies. Like ProShare™ document and video conferencing. Video software using the Indeo™ format. Even future performance upgrades with the OverDrive™ processor technology.

So before you buy another Mac, stop and ask some questions. Find out where Apple is going, especially with the PowerPC. Then ask Intel about the Pentium processor. What you find out might put you on a whole new path.

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intel®

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Make your MAC a powerful multimedia presentation system

TVator PRO is the lightweight, portable converter that connects to your Powerbook, MAC or IBM PC and delivers superior presentations for any occasion. It converts VGA to NTSC signals for flicker-free color output on TVs, projectors, or RGB/VGA monitors. Bundled with Macromedia's ACTION! Antec Incorporated **#98770**



\$21⁹⁸

Two Button Macintosh Mouse

The quality pointing device for your Mac

The Info Products Two Button Macintosh Mouse is a quality replacement for the Apple system mouse that plugs directly into the ADB port. This mouse offers 400 dpi resolution, configurable from the Control Panel. The left button acts as a normal "click button" and the right button as a "click lock button." Info Products **#98294**



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Performantz 270MB External Drive

The extra storage you need

An affordable high-performance, high-quality hard drive with an extra 270MB that could come in handy for huge applications or backups. Features an Quantum mechanism with an 12ms access time. Includes SCSI cable, external terminator, formatting software, and a 30 day money back guarantee. Performantz **#97961**



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6 Outlet Surge Protector w/Fax/Modem/Phone

Save your computer from power surges

Power surges can cause costly damage to your valuable computer and printing equipment, but with the proper protection you can avoid those damages. The 6 Outlet Surge Protector with protection for your Fax/Modem/Phone lets you run your system with the confidence that it won't be threatened by power spikes or harmful blackouts. Hunt Data Products **#98625**



Up to \$25,000
 Equipment
 Protection
 Warranty

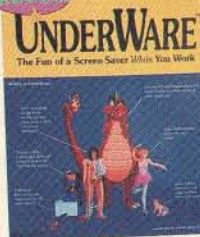
\$29⁹⁸

UnderWare

Totally wild and wacky!

- Plays animation *UNDER* your windows and icons
- Screen Saver modules interact with your Macintosh!
- Background customizer livens up your desktop

UnderWare is the hottest desktop diversion product of the year. It's a wacky desktop animator, screen saver, and background customizer that runs animation on your desktop, under your windows and icons! Over 25 animated modules including dinosaurs, dragons, ballerinas, babies, dancing icons, and more! Let the entertaining images run around your screen while they save it from damaging burn-in and liven up your daily routine with a new background. Runs your After Dark modules too! Bit Jugglers **#98364**



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Faxscanner

Turn your fax into a scanner

Your fax machine can be converted into a scanner that captures images with up to 200 dpi resolution! Print to any printer or back to your fax machine. Also includes TYPEREADER, which easily converts any printed material scanned or faxed to a PCX or TIFF image file at rates of hundreds of words per second. SVA Software, Inc. **#96765**
#96766 Faxscanner w/TypeReader 2.01 \$178.98



\$44⁹⁸

Square One 2.0

Streamline your desktop!

This power launcher makes it easier to launch, run and switch between programs and files. Its screen palette puts everything you need in one window. Add applications, folders, documents – even QuickKeys. It can handle an unlimited number of files. It's the ultimate desktop organizer and easier to use than the Finder! A simple double-click gets you anything you need. Binary Software **#06592**



\$79⁹⁸

Port Juggler

Easily manages all your ports

The Port Juggler allows you to share an expensive peripheral among four Macs or even attach more devices to a single Mac. What makes Port Juggler unique is that it continually monitors the ports and automatically selects the right port each time you use an attached device. Save the time and headache of having to remember which devices are attached to which port. Momentum **#97855**



\$269⁹⁸

Radius LeMans GT

The fastest 24-bit Mac graphics accelerator ever

This incredible new accelerator delivers 24-bit color at resolutions up to 1152x870 and has the best on-screen performance of any interface in its class. It also includes 3MB of ultra high-speed, on-board VRAM for optimum performance when you are working with photorealistic images at high resolution. Definitely for the serious designer who needs speed. Lifetime warranty. Radius **#97893**



\$98⁹⁸

TARGUS Leather Powerbook Case

Luxurious, yet affordable leather

This new case from TARGUS features a 15"x11"x2.5" padded computer section, a separate three-slot accordion file, an accessory pouch and a zippered document pocket to keep you and your equipment running smoothly and efficiently. TARGUS **#06610**

#06640 Leather PowerBook Case - Burg. \$98.98

#06640 Leather PowerBook Case - Tan .. \$98.98



\$64⁹⁸

At Ease 2.0, Hellcats Over the Pacific & Wealthbuilder 2.0

A great starter bundle

This innovative bundle lets you plan your finances, pilot a fighter jet and safeguard your computer and files from prying eyes. At Ease 2.0 lets you control data and lock your hard drive, Hellcats Over the Pacific lets you fight WWII from your own F6F jet, and WealthBuilder 2.0 is the personal financial planning and investing system. A great start-up kit for your Mac. Apple Computer, Inc. **#96748**



\$879⁹⁸

Alias Sketch! Bundled with Adobe Photoshop 2.5

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OR

\$758⁹⁸

Alias Sketch! Bundled with Adobe Illustrator 5.0

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Powerful design combinations!

MacWorld "Editor's Choice Award." Sketch! combines powerful modeling, composition, texture mapping, perspective matching, lighting and rendering features into one complete package. Alias Research, Inc.

NEW!
PRODUCT

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Futura II LX

Affordable, 24-bit color card

The affordable way to put 24-bit color graphics on displays up to 21 inches in size. Supports resolutions up to 1152 x 870, letting you work on two pages at once. Allows you to do exacting work with powerful desktop publishing applications. Installs easily in a single NuBus slot. SuperMac #98883

#99160 Futura II SX \$458.98

E-MACHINES.



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3.5" Optical Disk 128MB Mac Formatted

Save 30 minutes by not having to format!!

With this Optical Disk you can store up to 128MB on one cartridge that is rewritable, removable, highly reliable, and inexpensive. When you fill up a cartridge with data, you just pop in another one. Your storage capabilities are endless. It conforms to ISO/ANSO standards and provides reliable data storage. Verbatim #06028



\$74⁹⁸

PenFont

Add your handwriting to your Mac

Imagine personalizing your computer-generated documents! Well wonder no more, because Signature Software will design your personalized font from a handwriting sample, so you can instantly add your personal touch to FAXs, letters, and documents. Included are keyboard characters in your handwriting, your signature, and two symbols you design. A new way to add your personal stamp. Signature Software, Inc. #98084



\$188⁹⁸

Studio Series Design Group CD

5 ClickArt Studio Series Portfolios on 1 CD-ROM!

This outstanding collection of ClickArt Portfolios includes Business Art, Artistry & Borders, Sports & Games, Illustrations, plus Animals & Nature. Features the highest quality full-color EPS images, which also print in detailed grayscale on your B&W printer. Complete with a FREE on-screen browser so you can search by image or subject. T/Maker #14423

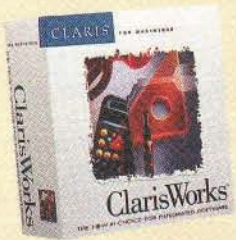


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ClarisWorks 2.1

Everything you need to get the job done

- Unique frame-based software architecture
- Professional results with a few clicks
- Fast & compact (600K)



ClarisWorks just might be all the Mac software you'll ever need. It combines full-featured word processing, graphics, spreadsheet, charting, database and communications in one, tightly integrated package. It gives you unparalleled flexibility to combine text, data, and graphics any way you want — all on the same page. Getting started with ClarisWorks is a breeze. There are outstanding training materials and sample files right in the box. And, comprehensive online help instantly answers your questions as you work. Whether you manage a growing business, are a corporate manager, or use a notebook computer, you need the affordable software that Claris Works 2.1 delivers. Claris #99733

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VERSION

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- Preformatted
- Includes High Speed Device Driver for Maximum Performance
- Includes Comprehensive DriveMASSter Utility Software

Through rigorous testing, DataCart has created the ultimate in removable Winchester cartridge technology in both 44 and 88MB capacity. Utilizing 5 1/4 inch media from IBM, DataCarts are reliable and backed by a Lifetime Warranty. Preformatted with the fully integrated Disk Management Utility, DriveMASSter, the cartridge provides extension partition, RAID 1 disk mirroring for fault tolerance and password protection. One year extended warranty on any SyQuest based removable cartridge subsystem provided by MASSmicrosystems.

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A new way to create presentations from your pictures using Kodak Photo CD, Audio CD sound, and your imagination. Import pictures from any number of Photo CDs, arrange in any order, add special effects, text, and your favorite music. Includes the Kodalux Photo CD Mailer, a prepaid processing of 1 roll of 24 exposures of 35mm film to Photo CD. InMedia Software, Inc. #96505



\$179⁹⁸

The Business Standard

The All-in-One Business Software

Complete Inventory Control through Order Entry, Invoicing, and Purchase Orders. Track inventory levels, customer orders, P.O.'s and sales histories. Print mailing labels, bar code labels, and interface with bar code labels, and interface with bar code scanners. Password security integrated through with multi-user, multi-location and point of sale features available. Chae #98306



Launch Your Mac into the World of PowerPC

DayStar 80 MHz PowerPro 601
PowerPC Upgrade Card

Apple PowerPC
Upgrade Card

Quadra 700

Relative performance shown for both cards running applications optimized for Macintosh with PowerPC in a Quadra 700.

The Quick and Easy Way to No Compromise Speed

| Features | Apple PowerPC Upgrade Card | DayStar PowerPro 601 |
|---|-------------------------------------|--------------------------------------|
| Average Street Price— 80 MHz 66 MHz | n/a \$699* | \$1999 \$1499 |
| Apple System software | Yes | Yes |
| Genuine Apple® ROMs | Yes | Yes |
| RISC processor | PowerPC 601 | PowerPC 601 |
| Restart as a 68040 Mac | Yes | Yes |
| Maximum operating speed— Centris 650 Quadra 700 and 900 Quadra 650, 800 and 950 | 50 MHz 50 MHz 66 MHz | 80 MHz 80 MHz 80 MHz |
| Memory expansion | 0 MB | 128 MB [†] |
| Maximum System memory— Quadra 700 Centris 650 Quadra 650, 800 Quadra 900, 950 | 68 MB 136 MB 136 MB 256 MB | 196 MB 264 MB 264 MB 384 MB |
| Cache size available | 1 MB | 1 MB [†] |
| Direct access to 64-bit memory | No | Yes |
| Upgradable to next generation PowerPC | No | Yes |
| Graphics utilities included— Native Photoshop filters Photoshop scripting Color management | No No No | Yes Yes Yes |

DayStar's PowerPC upgrade for the Quadra 650, 700, 800, 900, 950 and Centris 650.

DayStar designed the PowerPro 601 for the graphics professional seeking the maximum in PowerPC performance. You save time and money compared to purchasing a new Power Macintosh system. And, if emulation is too slow, the PowerPro lets you restart as a 68040 based Macintosh.

Developed in cooperation with Apple Computer, the PowerPro 601 has actual PowerPC ROM chips. So, you get the same functionality and compatibility as Apple's own Power Macintosh solutions.

Faster than Apple's upgrade card, the PowerPro 601 also offers up to

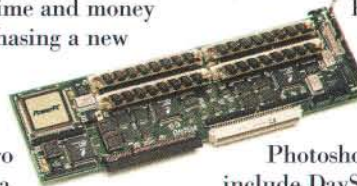
128 MB of additional memory expansion that combines with your motherboard memory.

For Photoshop users, we also include DayStar's revolutionary PhotoMatic scripting utility, and a broad family of filters that run Adobe Photoshop 2.5.1 at full PowerPC speeds! For Quark and

Photoshop users, we also include DayStar's ColorMatch color management solution. That's over \$600 of software, free!

As always, when you buy from DayStar, you will have access to the next generation of PowerPC technology through our cost saving Swap-Up™ programs.

So, don't take the slow road to PowerPC. Call DayStar today.



Adobe
charged

DAYSTAR
DIGITAL

* Speed varies between 40 MHz and 66 MHz depending upon Macintosh model. † Optional. Not required for operation.

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CIRCLE 93 ON READER SERVICE CARD

NEW ON THE MENU

PDAS /

APPLE'S NEWTON GROWS UP

The new MessagePad 110 boasts better handwriting recognition and more memory in a redesigned case.

IF YOU WERE AMONG THOSE who felt that Apple's first Newton, the MessagePad, failed to deliver on the promise of its underlying technology, take heart. Apple's new MessagePad 110 fixes some of the worst problems that irritated early adopters and puts the Newton on the right track.

Better handwriting recognition. Writing a few words on an uncustomized 110 returns something akin to English, I found. When this MessagePad misrecognizes a word, it gives you the option of reattempting it letter by letter. A new icon in the Notepad application lets you toggle both letter-by-letter and numbers-only handwriting recognition on or off as you write each word. Better yet, the MessagePad 110 supports deferred handwriting recognition. When you turn off the MessagePad's text recognizer, you aren't consigning the information you enter to an eternal life as unsearchable digital ink.

Beefed-up memory. The 110 has 1 megabyte of memory (the original came with 640K), and 512K of this is available for user data, so you can store much more information in your MessagePad without having to add a RAM-expansion card.

Extended battery life. The 110 uses AA batteries. Compared to the AAA batteries used in the first MessagePad, Apple claims, alkaline AAs will provide battery life that's twice as long and NiCd AAs will give four times the battery life. For those who use rechargeable batteries, a \$99 charger can simultaneously charge four NiCd batteries in the charger and the four NiCds in the MessagePad itself.

Improved ergonomics. The MessagePad 110 is slightly narrower and longer than the original model, so it's more comfortable to hold. The AA batteries add a couple ounces, however. When the 110 is in use, its top-mounted cover flips up and snaps behind the unit.

Lower price. At about \$600, the MessagePad 110 costs around \$100 less than the original, which was retired and was due to return in mid-April as the \$500 MessagePad 100. The 100 will have the old form factor, batteries, and RAM complement but will have the same version 1.2 ROM and version 1.21



For greater flexibility, the MessagePad 110's robust handwriting software lets you defer recognition as well as identify words letter by letter. Neat pen too.

system software as the 110.

Upgrades. The good news for early adopters: Apple will upgrade your original MessagePad to the new ROM and software for \$99. That price includes shipping to and from Apple and some free Newton applications to boot. 800-776-2333 or 408-996-1010. / Henry Bortman

PHOTOGRAPHY / TOM UPTON

QUICKTIME 2.0: COMING TO A BIGGER SCREEN NEAR YOU

JERKY QUICKTIME MOVIES may go the way of silent films, if Apple meets its goals for the next generation of QuickTime. Slated for early-summer release for 680x0 and PowerPC Macs, QuickTime 2.0 sports improved performance and new capabilities that make QuickTime movies look a lot more like real movies. Improvements include larger movies, music tracks, and support for the MPEG-1 video-compression standard.

Thanks to a new high-speed "data pipe" architecture, QuickTime 2.0 should be exceptionally fast, even on low-end machines. On an LC 475, for example, QuickTime 2.0 promises full-screen playback at 15 frames per second. Speed on Power Macs should be even faster.

Music tracks, which store MIDI data as part of a QuickTime

movie, give QuickTime 2.0 better-quality sound and playback than was possible with previous versions. During playback, QuickTime 2.0 either synthesizes the sound, using the Mac's built-in sound capabilities, or uses Apple's MIDI Manager to drive an external MIDI device.

Anticipating the future, Apple added MPEG-1 playback and improved network support in QuickTime 2.0, laying a cornerstone for the fabled interactive future and for better playback of QuickTime movies over local networks. MPEG playback means your Mac, with the assistance of an MPEG decompression board, will be able to display TV-quality video.

Pricing and distribution details were unavailable at press time. 800-776-2333 or 408-996-1010. / Sean Safreed



PRINTERS /

NEW INKJET PRINTS SMART COLOR

Hewlett-Packard ups the ante with 600-dpi DeskWriter models.

STAYING ONE STEP AHEAD of the competition, Hewlett-Packard has announced two new inkjet printers that improve on already highly successful models. The color DeskWriter 560C (\$719) and monochrome DeskWriter 520 (\$365) offer 600-dpi monochrome resolution as well as HP's proven Resolution Enhancement Technology (RET), which sharpens the edges of text and line art.

The DeskWriter 560C prints color text and graphics at 300 dpi, but it goes a step further with ColorSmart, a new color-rendering technology designed to improve the look of color graphics. ColorSmart could give the DeskWriter 560C an edge over Apple's new \$629 Color StyleWriter Pro (see New on the Menu, April '94, page 31), a 360-dpi

QuickDraw inkjet printer that offers halftone options. ColorSmart looks at page elements to identify text, graphics, and photos and then automatically applies the appropriate color-rendering and halftone settings for each (applying scatter halftones to photos, for example). You can manually override the settings at any time. The ColorSmart driver is also available for the DeskWriter 550C (whose price has been reduced to \$599) and the DeskWriter C. (To order the driver, call 303-339-7009.)

The DeskWriter 560C and 520 use improved cartridges that reduce ink splatter. But unlike Apple's new printer, which uses four discrete ink cartridges, HP's DeskWriter 560C still uses a two-cartridge assembly — one for black and the other for cyan, magenta, and yellow — so every time you run out of one color, you have to replace the entire cartridge. Both printers feature HP's EconoMode, a draft-quality printing mode that conserves ink. Reported printing times are 3 pages per minute (black) and 4 minutes per page (color). A \$249 PostScript Level 2-software option is available for each printer, although ColorSmart does not currently work with PostScript. (The DeskWriter 560C and 520 each come with 35 TrueType fonts.) 800-752-0900 or 408-725-8900.

/ Pamela Pfiffner



Hewlett-Packard's new DeskWriter 560C inkjet printer gives you sharp color output.



MACUSER/ZMAC UTILITY OF THE MONTH

DRAG-AND-DROP A-GO-GO

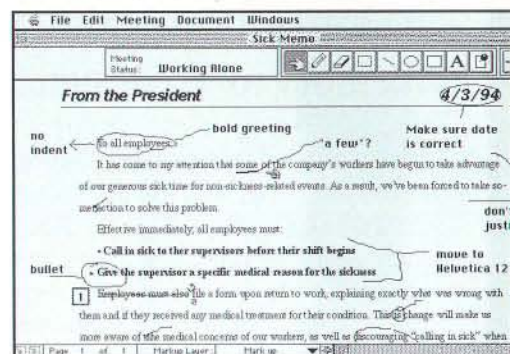
SYSTEM 7'S DRAG-AND-DROP capabilities make moving files and launching applications much easier than before but still require you to open a lot of folders to get to the right spot. This month's ZMac utility, DragonDrop, makes the task less of a drag; when you drag an item onto a folder, a pop-up window shows you the contents of the folder, letting you navigate down through the folder hierarchy until you reach your destination. The pop-up window can display the folder's contents in list or icon view. It's quick, it's economical, and it leaves no window clutter afterward.

DragonDrop was created by John and Sheila Wallace, of Fluent Software, the authors of Now Compress and last month's ZMac utility, WunderBar. The program is available exclusively on ZiffNet/Mac and from the ZiffNet Selections area on AppleLink; ZiffNet/Mac members can download DragonDrop free of connect-time charges until April 25, 1994, by typing GO MACUTIL. After that, they can find the file DRAGDP.SIT in Library 3 of the MacUser Forum (GO MACUSER). AppleLink users should look for DragonDrop in ZiffNet Selections:MacUser Software:Utilities. / Mark Simmons

BUSINESS TOOLS /

CONFERENCE-CALL EDITING

COLLABORATIVE EDITING of paper documents hasn't ever required much overhead — just a pen, legible handwriting, and a conference table. However, if the people dissecting a document aren't in the same room, things can get complicated.



Face to Face includes a freehand drawing tool for marking up text and an annotation tool for making comments.

Face to Face, from Crosswise, attempts to solve the problem of long-distance document editing by allowing a pair of users (connected via network or even by modem at speeds of 2,400 bps or more) to watch one another mark up any electronic document in real time and across platforms.

Priced at \$295 and available for Macs and Windows machines, Face to Face offers such tools as a freehand pen, an on-page text annotator, and a note creator that brings up windows for longer comments. As a result, two users (preferably also talking to one another on a separate phone line) can mark up a document together, agreeing on necessary changes. The Face to Face file is monochrome-only, however, so you can't assign colors to distinguish annotations.

Marking up a document is easy, but you can't edit it — it's an image file akin to those created by fax-modem software. After changes are marked in Face to Face, someone has to manually make them in the original file. You can scroll through Face to Face pages on-screen, but you can't resize the viewing window, which limits your work area on large-screen monitors.

Apple's PowerTalk user directory is supported, but Face to Face currently allows only two users at a time. And the program is not compatible with portable documents such as those created by Adobe Acrobat and No Hands Software's Common Ground, although Crosswise is hinting at future support for those formats. 408-459-9060. / Jason Snell

IS THAT ALL THERE IS?

Speed isn't the only advantage of the PowerPC.

WITH THE LONG-AWAITED INTRODUCTION of the Power Macs, we have Macs with more horsepower than we can shake a stick at. But so what? As many detractors have sniped over the past few months, PowerPC-based Macs just run Mac software faster than 680x0 Macs, provided the software's native. But is that all there is? The answer lies in the interface.

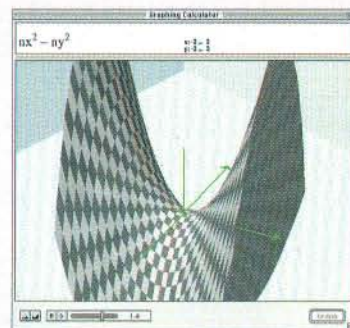
From day 1, the promise of the Mac has been to make computing more accessible and pleasant. The single greatest factor that determines ease of use is the interface, and here's where PowerPC technology will subtly but fundamentally change the way Mac applications behave.

The only native application Apple ships on the hard disks of its new Power Macs is innocuously named Graphing Calculator. Much more than a simple number cruncher, this application points to extremely responsive user interfaces that the PowerPC's power will make possible as developers begin to take advantage of it. Graphing Calculator allows you to graph algebraic equations — exactly the kind of capability you wish you'd had in school. It's an extraordinary piece of software,

not because of its equation-solving abilities but because of the way it presents itself to users.

After entering an equation, you click on the Graph button and almost instantly see the resulting 2-D or 3-D graph — nothing special yet, except that it's a lot faster than with a 680x0 Mac. The kicker comes when you use your mouse to spin a 3-D graph. Graphing Calculator animates the graph and smoothly rotates it around the central axis, recalculating each frame in real time — a feat that underscores the PowerPC 601's floating-point performance. You can zoom in and out and change one variable, which Graphing Calculator updates as it animates. This kind of on-the-fly recalculation just isn't possible on a 680x0 machine.

If you're tired of waiting for an application to recompute a preview or you've ever wished you could manipulate an image and just see how it looks, without the redraw lag, take a peek at Graphing Calculator. It's an indication of what's to come for the Power Mac.



Apple's Graphing Calculator uses the PowerPC's computational oomph to animate complex graphics on the fly.

MULTIMEDIA TOOLS /

ADOBE PREMIERE 4.0 GOES HOLLYWOOD

FIRST ADOBE PREMIERE made QuickTime-movie editing accessible to the masses. Now Premiere takes users further into the realms of professional video editing while boasting an interface that makes it easier to use. Due out this June as a PowerPC native application, Premiere 4.0 offers enough enhancements to earn its new version number; foremost among these are improved editing tools and added video specifications.

To make editing easier, Premiere 4.0 includes

new floating palettes such as the Commands palette and the Trimming window, which lets you fine-tune the cut point of edits by showing before-edit and after-edit clips simultaneously. Another time-saver is the ability to make multiple selections in the program's Construction window.

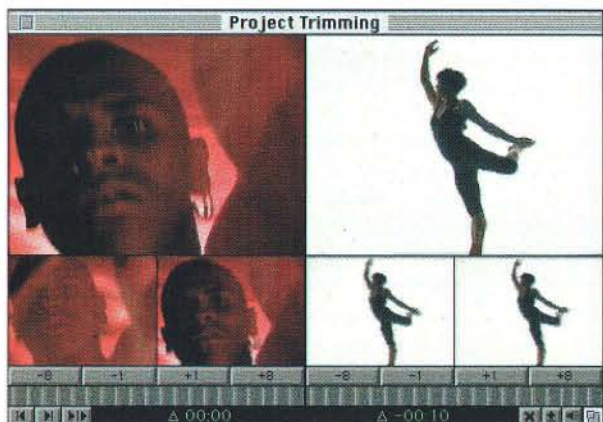
For better accuracy, Premiere 4.0 offers an exact video-editing rate of 29.97 fps (frames per second) throughout the program, as opposed to the previously rounded-off 30 fps. New field-accurate control includes support for full 60-field-per-second animations, which allows for seamless compositing. And you can preview your edits dynamically in the Project Viewer window, which means you no longer have to wait for Premiere to process all effects; unprocessed effects appear as grease-penciled frames, a metaphor familiar to video professionals.

Batch processing streamlines several functions. Premiere can batch-process entire projects, so you can let filter effects image overnight. You can also set the program to batch-capture a whole set of clips unattended. The new Premiere is also smart about handling high-resolution clips. If you use low-resolution clips for proofs, Premiere 4.0 knows to look for their high-

resolution counterparts for the final edit, saving you capture time.

Whizzy new effects include stop-motion capture from any video source, so you can create time-lapse animations. Photoshop-compatible filters can be varied over time so effects appear animated, and you can preview filters, transparency settings, and motion effects on an NTSC monitor. The new Gradient Wipes feature lets you use any gray-scale image, such as one created in Photoshop, to act as a transition effect, resulting in subtle blends from frame to frame.

Adobe Premiere 4.0 (includes deluxe CD-ROM), \$795; upgrade from Premiere 3.0, \$79; upgrade from previous versions, \$129. 800-833-6687 or 415-961-4400. / Jeffy Milstead and Sean Saftred



Premiere 4.0's Trimming window gives you interactive control over transitions and lets you preview your edits.

WORD OF MOUTH

"GAME CHARACTERS need to be able to do more than travel, acquire, and fight. With higher budgets will come good writing, acting, and direction. Until then, it will be kill or be killed." / Mike Backes, cofounder, Rocket Science Games, on the need for multimillion-dollar budgets in game development, at the MILIA '94 conference, in Cannes, France

COLOR MONITORS /

BIG DISPLAYS USE LITTLE ENERGY

Apple, Nokia monitors feature flexibility.

NEED A MONITOR to go with that new Power Mac? Adaptable displays from Apple and Nokia may fill the bill.

To kick off the next generation of Macs, Apple unveiled its first multiple-resolution monitor. Priced at less than \$2,100, the 20-inch Multiple Scan 20 includes Display Manager software, which lets you move among nine resolutions according to your work requirements. Pixel resolutions range from 1,280 x 1,024 at 75 hertz, for working on detailed graphics, to 640 x 480 at 66.7 hertz, for playing QuickTime movies. For connection to PCs, the display also offers VGA resolutions (a Mac-to-PC adapter ships with the unit).

The Multiple Scan 20 includes Apple ColorSync profiles, for working with color-management systems, and the Energy Saver, software that puts an inactive monitor to sleep, thus lowering power consumption.

Built around a Sony Trinitron tube, the unit sits on a swivel monitor base with a front control panel and accessible ADB ports for attaching a keyboard and a mouse. MPR II and Energy Star compliance and antiglare coating round out the package. 800-776-2333 or 408-996-1010.

Nokia, a Finnish producer of monitors and televisions, is not widely recognized in the U.S., although its technology is used by many major vendors. Nokia's latest U.S. release is the Multigraph 447X, an autosynchronous 17-inch monitor that offers on-screen digital controls previously available only on Nokia's 21-inch models.

A button on the Multigraph 447X's front panel calls up a scrolling list of controls that permit adjustment of color temperature; image tilt, height, and width; red, green, and blue signal intensity; and more than a dozen other parameters. The monitor also meets MPR II standards (and offers optional support for the stricter TCO emissions standard) and comes with a three-year warranty. \$1,150. 415-331-0322. / Jim Shatz-Akin



MONITOR THE FUTURE

THE FUTURE OF MONITORS looks pretty flat, at least if this experimental display from Radius is any indication. The sleek-looking unit combines a slim LCD panel with Radius' pivot technology, which enables it to flip from vertical to horizontal (Radius is implementing technology to eliminate color shift and other LCD-related problems that arise from changing the orientation). For presentations, the unit detaches from its stand so you can hang it on the wall. The monitor, whose current prototype is based on a Sharp screen that has a resolution of 1,024 x 768 dpi and supports 16-bit color, is expected to ship in early 1995. The cost? Estimates range from \$7,000 to \$10,000. 408-434-1010.

/ Pamela Pfiffner



MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects national sales activity for the new and secondary Mac market as of February 10, 1994. Prices (except those for compact models) do not include a monitor or a keyboard. New prices represent the average discount selling price of current models. The United Computer Exchange is a national clearinghouse for buyers and sellers of used micro-computer equipment. For more pricing information on these models and on configurations not listed, call 800-755-3033 or 404-955-0569 or find it on ZiffNet/Mac, in Library 1 of the MacUser Forum (GO ZMC:MACUSER), as UCEIDX.WRD (Microsoft Word format) and UCEIDX.TXT (ASCII text format); on AppleLink, look for it in ZiffNet Selections:MacUser Software:Reference.

| Mac Model | New | Used | Mac Model | New | Used | Mac Model | New | Used |
|----------------------|-------|-------|----------------------|----------|---------|----------------------------|---------|---------|
| Plus (1/20) | • | \$300 | Ilfx (8/160) | • | \$1,375 | PowerBook 100 (4/20) | • | \$700 |
| SE (1/20) | • | \$400 | Ilvx (4/80) | • | \$900 | PowerBook 140 (4/40) | • | \$875 |
| SE/30 (5/40) | • | \$700 | Centris 610 (4/80) | • | \$1,000 | PowerBook 145 (4/40) | • | \$1,050 |
| Classic (2/40) | • | \$475 | Centris 650 (8/230) | • | \$1,750 | PowerBook 145B (4/80) | \$1,349 | \$1,175 |
| Classic II (4/40) | • | \$625 | Quadra 605 (4/80) | \$899 | \$775 | PowerBook 160 (4/80) | • | \$1,450 |
| Color Classic (4/80) | \$999 | \$750 | Quadra 610 (8/230) | \$1,779 | \$1,400 | PowerBook 165 (4/80) | \$1,699 | \$1,500 |
| LC (2/40) | • | \$375 | Quadra 650 (8/230) | \$2,099* | \$1,800 | PowerBook 165c (4/80) | • | \$1,475 |
| LC II (4/40) | • | \$475 | Quadra 700 (8/230) | • | \$1,450 | PowerBook 170 (4/40) | • | \$1,350 |
| LC III (4/80) | \$767 | \$625 | Quadra 800 (8/230) | \$2,399* | \$2,050 | PowerBook 180 (4/80) | \$2,199 | \$1,850 |
| II (5/40) | • | \$425 | Quadra 660av (8/230) | \$1,899* | \$1,725 | PowerBook 180c (4/80) | \$2,549 | \$2,100 |
| IIsi (5/40) | • | \$600 | Quadra 840av (8/230) | \$3,199* | \$2,825 | PowerBook Duo 210 (4/80) | • | \$1,075 |
| IIx (5/40) | • | \$775 | Quadra 900 (8/230) | • | \$1,875 | PowerBook Duo 230 (4/120) | \$1,529 | \$1,275 |
| IIcx (5/40) | • | \$550 | Quadra 950 (8/230) | \$3,599* | \$3,250 | PowerBook Duo 250 (4/200) | \$2,259 | \$1,875 |
| IIci (8/80) | • | \$900 | Portable (1/40) | • | \$375 | PowerBook Duo 270c (4/240) | \$3,097 | \$2,700 |

* = discontinued model

*Reflects Apple's February 8 price reductions.

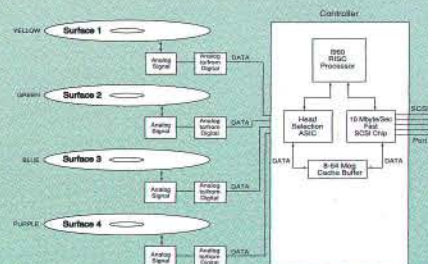
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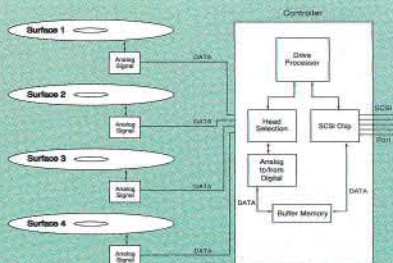
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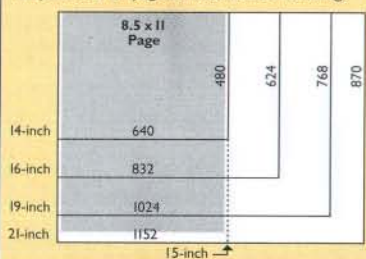
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Recent Reviews



Full-page
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Full-page
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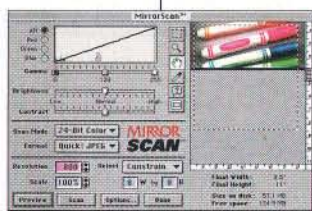


When Macworld's experts tested a field of 14 color scanners, they concluded that you don't have to pay a lot to get a good scanner; you just have to call Mirror.

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Mirror's award-winning scanners start with a precision three-pass scanner engine for superb color registration and sharpness. Then we add hardware pre-scan gamma correction for top quality results in much less time.

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| 1200 dpi w/Photoshop 2.5.1 and Read-It! | \$1599 |
| Transparency Adapter for 600/800 models | \$ 599 |
| Transparency Adapter for 1200 model | \$ 699 |
| Mirror CoolScan Slide Scanner | \$1999 |

user-definable custom selections and support for EPS, TIFF and PICT file formats, MirrorScan makes it easy to get great scans.

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REVIEWS & Quick Clicks

4D First / ACI US reaches out to the entry-level relational-database market with a new, simpler version of 4D.

OUTGROWING FILEMAKER PRO but not ready for a developer-oriented relational-database program such as 4th Dimension or Microsoft FoxPro? Try **MacUser Labs** ACI US' 4D First, an entry-level relational-database program based on the same engine as 4D.

Powerful Yet Approachable

4D First offers impressive capabilities for a low-end database program — more impressive than those of its predecessor, File Force. It's relational, so you can have one data file look up and change information in other data files; it's more programmable than File Force, so you can automate almost any database task; and it's packed with all the tools you need in order to build a custom database application.

To make 4D First more approachable than 4D, ACI US has simplified the user interface (mostly by reducing choices in areas such as dialog boxes, because much is assumed and done for you automatically) and has written easier manuals. It's also pared away some of the more sophisticated programming commands, such as those for tuning performance, handling multiple-window processes, and creating compiled applications. The only things missing are built-in multi-user capabilities and portability to other platforms (ACI US plans to port 4D to Windows, Windows NT, Chicago, and Solaris platforms late this year).

Click 'n' Create

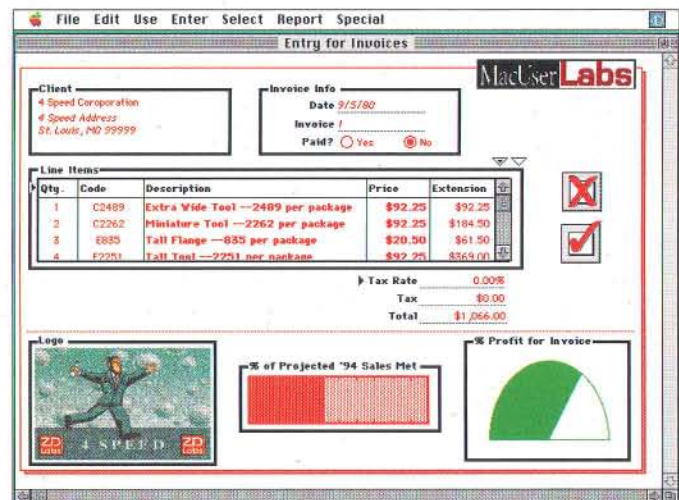
Creating a database in 4D First takes just a few minutes. Using the program's new-file cursor, you simply click in the graphical structure editor to create new files and then double-click on each file to create and edit field definitions. A simple dialog box allows you to define field types and options. Creating relational links between two files is especially easy — just drag between key fields in the files.

You will run into a few quirks, though. Keyboard command equivalents and default buttons often don't perform the actions you expect. For example, when you type Command-P, you get a procedure instead of the Print dialog box. Also, if you press Enter after defining a field, 4D First assumes that you want to define another field. Overall, creating extra fields accidentally is all too easy, and you can't delete fields (or files!) once you've created them.

If you don't want to customize your layouts, you can go straight to 4D First's User environment after defining your files and fields. The program automatically creates Input and Output layouts for you to use in this environment, so you can enter data immediately after defining files and fields. You can also search, sort, execute scripts, and print reports and labels with relative ease. Unfortunately, though, the User environment gives you just one working window — to view records from multiple files, you must create a custom layout.

Highly Customizable

If you venture beyond 4D First's predefined layouts (which aren't especially attractive), you'll find that the layout editor provides plenty of flexibility. A full set of drawing tools, user-interface items (buttons, check boxes, thermometers, and so on), and a variety of field-formatting options let you create highly customized layouts. You can even create layouts that display and let you edit information from another file, a capability missing from the automatically generated layouts. As with other parts of 4D First's interface, though, you'll need to explore the



4D First is an entry-level relational-database program, but it doesn't lack powerful tools. Once you've mastered the layout tools, you can create sophisticated custom layouts that include buttons, graphs, and information from multiple files.

tool palette carefully in order to find the best way of doing things. An automated layout assistant would be a welcome addition, as would a wider variety of (better-designed) predefined forms.

Once you've created a custom layout, you'll be tempted to round out the database interface with custom menus, multiple windows, and maybe even some security features — all of which are nicely supported in 4D First. The menu editor lets you create and modify menu bars and attach custom procedures (routines written in 4D First's programming language) to individual menu items. You can set these procedures to run in

Reviews Rating Key

- ★★★★ Outstanding
- ★★★★ Very Good
- ★★★ Acceptable
- ★★ Poor
- ★ Seriously Flawed
- ☹ Dangerous

their own windows, so, for example, a Client entry screen and an Inventory entry screen can be open simultaneously. The security features in 4D First let you assign passwords, restrict access to certain files and functions, and track database usage.

The programming language built in to 4D First is powerful — it's a robust subset of 4th Dimension's — but it's not especially easy to use. The language gives you almost complete control over everything you can do in the program, including entering data and searching, sorting, deleting, duplicating, and printing records. It would be nice if more of these powerful functions were automated, however. To calculate the total for an invoice, for example, you must write a script that performs the calculation and then place the script in the appropriate location (not always obvious).

Not 4D Fast

Although 4D First is powerful, its speed is less than impressive. We clocked five typical database-program operations (importing, deleting, printing, searching, and sorting), using a data set consisting of 2,500 client records, 625 inventory items, and 320 invoices with five line items each. We performed the same tests with a similarly sized flat-file FileMaker Pro database and compared the results. We also tested 4D First's ability to handle large increases in file size, by timing the same five operations on databases containing 5,000 and 10,000 client records.

Overall, we didn't find 4D First much faster than FileMaker Pro. In fact, 4D First was slower at some tasks, although it does things FileMaker Pro can't. 4D First was notably faster at deleting 250 records and at sorting 2,500 records on a single key. It was slightly slower than FileMaker Pro at importing records, however, and considerably slower at sorting on two keys and at spooling 500 records for printing in a simple list format.

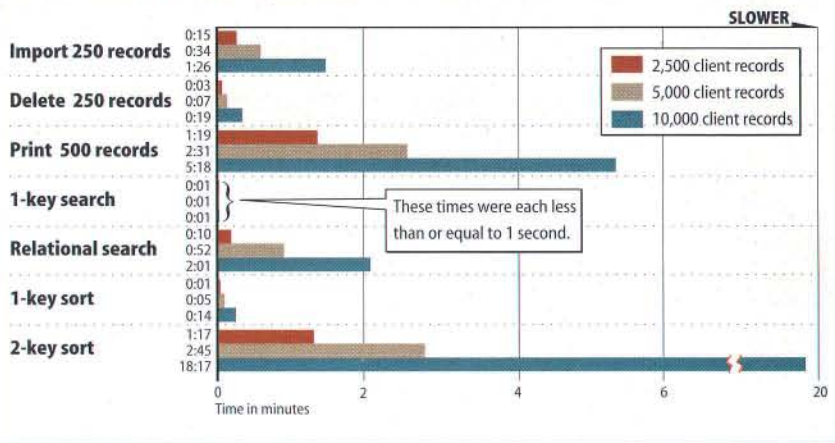
For searching, 4D First and FileMaker Pro were closely matched. The only 4D First search operation we found somewhat slow was a search across relations — an operation the flat-file database program can't perform at all.

When we increased the size of the 4D First database to 5,000 and then 10,000 client records, we found that importing, deleting,

figure 1

Bigger Files, Longer Waits

"Less than lightning-fast" was our overall impression of 4D First's speed. Whereas some operations were reasonably fast, printing was generally slow and the program's speed on compound-key sorts and on searches across files degraded greatly when we increased the number of client records in the database.



and printing records and doing simple searches (one key, one data set) scaled fairly linearly — that is, the same operation with twice the number of records took roughly twice as long. Sorts and complex searches, however, showed more-dramatic speed degradations when we increased the size of the database. Sorting speed degraded between 5,000 and 10,000 records, with compound-key sorts showing the worst degradation, taking nearly 3 minutes for 5,000 records and more than 18 minutes for 10,000 records. Search operations across relations also showed serious degradation when we increased the database size from 2,500 to 10,000 records (10 seconds for 2,500 records versus 2 minutes for 10,000).

4D Family Values

4D First's value as a member of the 4D product family is another consideration for potential buyers. If your needs grow beyond the capabilities of 4D First, you have the option of converting your 4D First databases to 4th Dimension 3.1 or later. And to add multiuser capabilities, you can move 4D First databases to 4D Server, ACI US' client/server product for the Mac — the upgrade cost to 4D Server (\$1,500 for three users) is significant, though. Interestingly, 4D First also works as a single-user run-time module for 4D databases, making it a useful application for users who want to customize such databases.

The Bottom Line

So, is 4D First the database program you've been hoping for? Maybe. If you need to create sophisticated single-user databases in which the focus is on features and interface, 4D First can do the job. Its usefulness for running and editing 4D databases is another plus.

However, if your priorities are stellar performance, inexpensive multiuser capabilities, and established cross-platform compatibility, you may have to look beyond this entry-level relational-database product to a more complex development environment such as Microsoft's FoxPro. Alternatively, you can wait for ACI US to fulfill its cross-platform promises and its PowerPC intentions — we just heard that the company plans to ship a PowerPC-compatible version of 4D First sometime this summer. / J. W. Davis

4D First 1.0

Rating: ★★☆☆

List Price: \$295.

Pros: Fully relational. Easy database setup. Flexible layout editor. Programmable. Runs 4D databases.

Cons: Some interface quirks. Programming could be easier. Mediocre speed. Multiuser capabilities cost extra.

Company: ACI US, Cupertino, CA; 800-384-0010 or 408-252-4444.

Reader Service: Circle #401.



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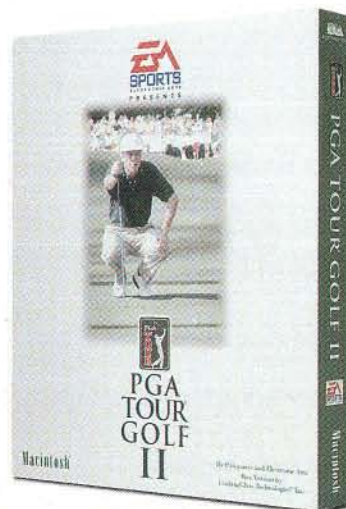


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Passport Producer Pro / Passport Designs' multimedia presentation tool goes interactive.

BILLED AS A REAL-TIME production tool for interactive media, Passport Producer Pro is a sweeping upgrade to Passport Designs' Passport Producer presentation software package. Aimed at multimedia professionals looking for an alternative to programming with Macromedia Director, Passport Producer Pro boasts a highly graphical interface that makes it easier to use than Director. Passport Producer is an excellent tool for synchronizing video and audio devices — including MIDI — for live presentations; the Pro version goes further by adding support for interactive-presentation elements.

Take Your Cue

Passport Producer Pro retains the same basic interface as its predecessor, with several additions. The chief enhancement is Producer Pro's ability to create user-configurable interactive elements — buttons that trigger actions. Any object or on-screen area can be configured as a button.

The program's controls for configuring buttons are intuitive, making it easy to create sophisticated effects, such as buttons that change their appearance when users click on them or that transform the cursor when it's placed over them. Creating similar effects with Macromedia Director requires considerably more elbow grease.

Creating presentations with Producer Pro is relatively straightforward. You select

icons representing media and control elements from palettes and drag them into the program's main window, the Cue Sheet. The Cue Sheet is a timeline that lets you graphically organize your elements, or *cues*, in horizontal tracks. Time is measured in SMPTE time code.

To modify your presentation, you simply reposition elements in the Cue Sheet by sliding their icons along the timeline. For extra-precise timing, you can type in start and end times for each element.

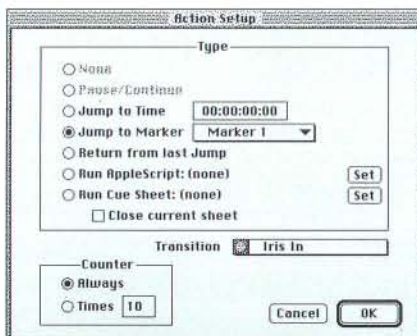
Producer Pro lets you customize the look of the Cue Sheet too. For each element, you can either view its numerical parameters (start and end times, for example) or view it graphically. With the latter option, you can view the first frame of a QuickTime-movie element, which is helpful for organization. Producer Pro also boasts a variety of new transition effects for dissolving and wiping elements.

Ready for Action

Buttons can trigger actions, but you can also place action cues in the Cue Sheet. When the playback bar in the timeline comes to the action cue, the action is performed. A convenient counting mechanism keeps track of how many times an action cue is played, so you can set another action to occur after a cue has been triggered a certain number of times. To set up a similar effect in any other authoring system, including Director and HyperCard, you have to create a fairly complex script.

Actions can produce a variety of results, including branching to a specific frame or marker in the Cue Sheet (similar to Director's frame/marker branching), launching another Cue Sheet, pausing or continuing playback, and initiating AppleScript macros. AppleScript support allows for some sophisticated possibilities. For example, a presentation can launch an external application as well as control any aspect of machine behavior.

In addition to action cues, Producer Pro features new video-window and machine-control cues. The video-window cues



Intuitive controls for creating interactive presentations are a strong suit of Passport Producer Pro. The Action Setup dialog box lets you specify what actions occur when you click on a button or trigger an action cue.

support a variety of video digitizers and enable you to play live video directly to the screen. The machine-control cues control video decks and laserdisc players connected to the video digitizers. Producer Pro supports protocols for Sony ViSCA, MIDI Machine Control, Pioneer Laserdisc, and V-LAN and ARTI networks. Also worth mentioning is the CD Disc cue, which plays any track from an audio CD in a CD-ROM drive — a unique and useful feature.

Once you've placed all of your elements in the Cue Sheet, you can switch to Producer Pro's Stage view to see how each element will be positioned on-screen at playback. If you need to adjust positioning, you simply drag elements around onstage. The handy stage grid allows for uniform positioning. New with Producer Pro is the ability to move elements onto and off the stage, using basic motion paths. You can't enhance motion paths with complex variables such as rotation and scaling, however.

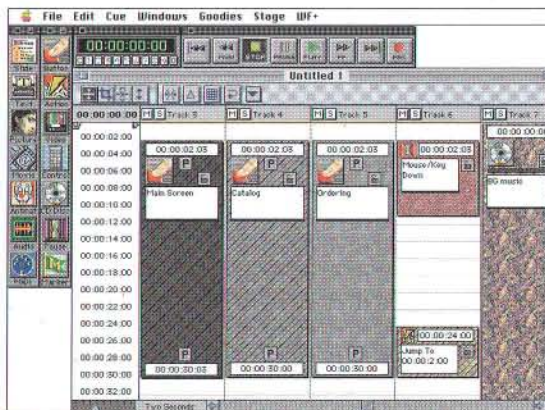
Text handling is significantly improved in Producer Pro. You can now create bullet-point entries and anti-aliased text, but typographical fine-tuning features, such as leading and kerning, are still absent (to be fair, we should note that these capabilities are also missing from Director).

Many of the minor bugs we encountered in Passport Producer have been fixed in the Pro version, including a particularly bothersome QuickTime-movie redraw problem. Overall, Producer Pro feels much more solid and reliable than its predecessor. We did run into one annoying limitation, though — when we used buttons to jump from one part of a Cue Sheet to another, the sound and music that were playing when the jump occurred simply stopped instead of playing along smoothly through the branch. And one feature we'd like to see incorporated in subsequent versions is the ability to group cue elements, such as a set of related buttons or action cues.

Producer Pro runs on any color Mac, but you'll want at least a Quadra-class machine for optimal playback performance, especially when you're working with simultaneous events. And although the company

recommends at least 8 megabytes of RAM, we recommend 12 to 20 megabytes for those who want smooth-running presentations.

Producer Pro's documentation is very clear. The comprehensive tutorial covers many aspects of creating interactive presentations. A run-time player and a pair of CD-ROMs, which contain sample audio and animation clips you can use with your presentations, are also included.



The Cue Sheet, Passport Producer's main window, lets you organize presentation elements — including buttons (tracks 3 to 5) and actions (bottom of track 6) — along a timeline.

Owners of Passport Producer can upgrade to Producer Pro by paying a \$15 shipping-and-handling fee — a great bargain.

The Bottom Line

Multimedia professionals looking for an easier-to-use alternative to Macromedia Director will likely find what they need in Passport Producer Pro. And for those whose requirements include MIDI support and the ability to do live presentations, Producer Pro has no equal. There is a trade-off, though: Despite its strengths, Producer Pro is not a complete replacement for the full-blown authoring and animation capabilities of Director. / David Biedny

Passport Producer Pro 1.0

Rating: ★★★★★

List Price: \$995; upgrade from Passport Producer, \$15.

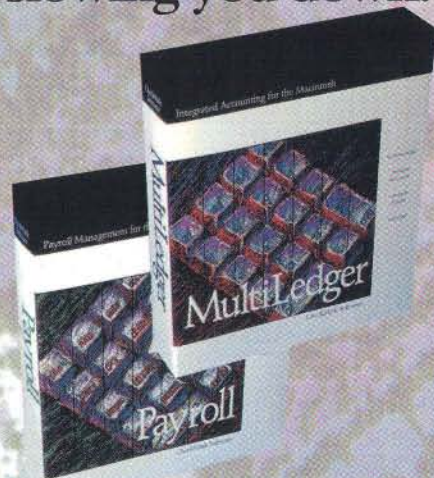
Pros: Intuitive controls for interactivity. Excellent live-presentation and audio support.

Cons: No tools for fine-tuning type and grouping cues. Minor sound bug.

Company: Passport Designs, Inc., Half Moon Bay, CA; 415-726-0280; 415-726-2254 (fax).

Reader Service: Circle #402.

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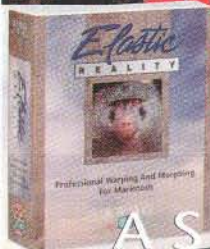


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LANsurveyor / Neon Software puts easy network troubleshooting on the map.

NEON SOFTWARE'S LANsurveyor combines some of the best features of network-polling, -monitoring, and -inventory programs under a simple graphical front end. LANsurveyor builds a logical map of any AppleTalk network and lets network managers inspect and test connections between devices. Because LANsurveyor lets you associate icons with any application you want to launch from within the map, it also makes a great console for troubleshooting and managing devices on a network.

More Than Mapping

When you create a new map, LANsurveyor discovers all the objects — nodes such as Macs, printers, network modems, and routers — in the selected AppleTalk networks by discerning which services they're advertising. Each network object is assigned a customizable icon, based on the highest-priority service it's advertising, and you can juggle these priorities so the information most important to you stands out on the map. For example, by assigning AppleShare a higher priority than the Mac operating system, you can quickly see which Macs on the network are running AppleShare.

Once the map has been built, you can select objects for polling or monitoring. Polling sends echo packets to the selected devices; if a packet doesn't answer in the specified time period, a preconfigured alarm alerts you by sound, message-display box, QuickMail, or pager system (the pager system, from Notify, costs \$99 extra).

Monitoring devices means gathering SNMP-based traffic statistics for each device as well as keeping track of the percentage of error packets (you can have LANsurveyor notify you if the number of errors exceeds a specified threshold). Because most AppleTalk routers respond to the required SNMP requests, you can monitor them easily; Macs must have Apple's MacSNMP client software — available in AppleTalk Connection for the Macintosh (\$32 for the initial package and \$39 more for a 20-user license) — installed before you can monitor SNMP data, which is much more extensive than the basic Responder data.

Polls, monitors, and logs are stored with

the map. Unfortunately, LANsurveyor can't automatically gather poll data over a period of time; you must save the data under a different name each time it polls, exporting it to tab-delimited text files. You can then import the files into a program such as Microsoft Excel to plot the peaks and valleys.

Unlike the mapping modules included with tools such as GraceLAN and Network Supervisor, LANsurveyor builds a map based on the relationship of network devices to the physical cable rather than to the zones. This means you can trace the path between devices for easier troubleshooting.

You double-click on an icon on the map to perform a simple query or generate a report. And Apple-events support lets you launch other applications — for example, you can link Neon's RouterCheck to router icons and launch it as needed. Customizable note fields let you keep notes on your findings.

The Bottom Line

Neon Software's LANsurveyor is an excellent network-management and -troubleshooting tool. Because it uses a cable-based map as its front end, LANsurveyor is great for tracking down disconnections, broken cables, and faulty network cards. And because you can collect SNMP-based traffic data about your routers and those Macs equipped with the MacSNMP client software, you can set thresholds that let you proactively monitor your network. To top things off, LANsurveyor 1.1, which runs on PowerPC Macs, should be available by the time you read this. / Kelli Wiseth

LANsurveyor 1.0

Rating: ★★★★★

List Price: 5-zone version, \$395; unlimited-zone version, \$695.

Pros: Cable-based map allows easy device management and troubleshooting. Collects SNMP data. Can notify you when thresholds are exceeded.

Cons: Can't automatically gather poll data over time for trend observation.

Company: Neon Software, Inc., Lafayette, CA; 800-334-6366 or 510-283-9771; 510-283-6507 (fax).

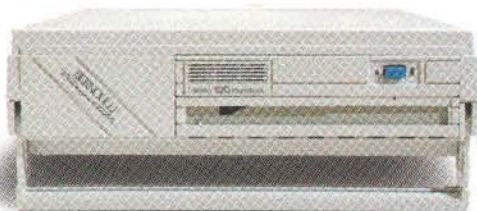
Reader Service: Circle #403.



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| Bernoulli Advantages | Bernoulli MultiDisk 150 | SyQuest 88c |
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| 70% more capacity. | 150MB | 88MB |
| Handles over 3x the shock—no more courier/mail worries. | 96 inch drop | 30 inch drop |
| Mounts every time. | Yes | No |
| 2/3 the cart cost per megabyte. | 67¢/MB | \$100/MB |
| More capacities to choose from to fit your job. | 35, 65, 90, 105, 150MB | 44, 88MB |
| Competitive performance. | 18 msec | 20 msec |
| Resists head crash. | Yes | No |

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DayMaker Organizer 3.0 / Pastel's powerful PIM gets more personable and phone-savvy in version 3.0.

PERSONAL INFORMATION managers and calendar programs are an idiosyncratic bunch, and Pastel's DayMaker Organizer has been no exception. Although DayMaker is one of the most powerful PIMs available for the Mac, its previous interface was less than intuitive and it was occasionally unstable in early releases.

In version 3.0, however, Pastel has made DayMaker much stronger by simplifying its user interface, adding contact and phone-call management, and improving the program's speed in saving files and deleting records and in changing views.

Everything's Itemizable

The heart of DayMaker has always been the *item*, Pastel's term for any bit of information

forced to choose between calendar and to-do classifications, for instance, and alarms are an option in either case. However, this flexibility has also frustrated some users in the past; those who weren't careful could become lost in an unstructured maze. Fortunately, Pastel has cleaned up DayMaker's interface in this version, with simpler default views, more-logically arranged menus, and less-confusing terminology (*categories* instead of *tags*).

Contact Highs and Lows

Contact management is a significant addition in DayMaker 3.0, for several reasons. First, it's actually an add-in module designed to take advantage of a new modular architecture. Pastel hopes the architecture

contact item as many as three categories for additional sorting.

The People Picker window, a compact list of contacts that's available whenever you're not in the Contact view, is a particularly helpful new feature. You can drag a name from the People Picker window and drop it onto a certain day to automatically link the contact to any phone call, calendar event, or other item on that day.

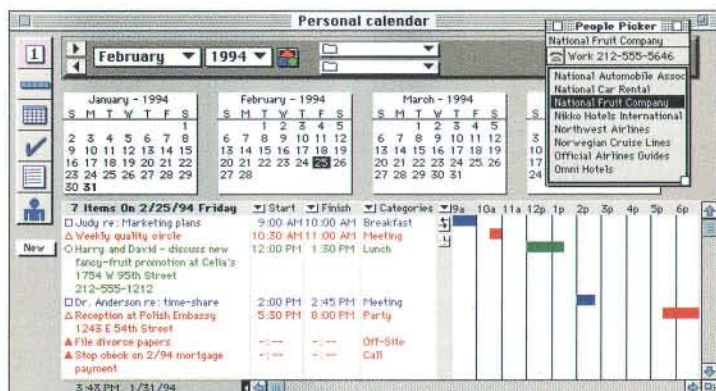
After importing a 2,500-name FileMaker database file into DayMaker (with some effort), we were pleased to find that DayMaker's speed at finding a name remained reasonable. However, we were a little disappointed at the resultant file size; at almost a megabyte, it's a bit large for moving back and forth between a desktop Mac and a PowerBook.

Fancy Phone Tricks

The new call-management feature also adds a great deal to DayMaker's power and flexibility. This feature lets you automatically dial phone numbers directly from within the program. You can also create special phone notes for tracking calls and automatically setting up follow-up actions. Unfortunately, DayMaker's automatic-dialing feature, like most autodialers, has problems with automated switchboard systems; it didn't work with our office Centrex system.

The Bottom Line

Version 3.0 of DayMaker is a mature, solid product likely to attract many loyal users. DayMaker veterans who once used it mostly to list to-do items and reminders can now use it to manage all of their appointments and contacts, dutifully dragging their PowerBooks on all outings. Now, if Pastel would only hurry up and release its Newton version of DayMaker . . . / John Markoff



You can access your contacts at any time in DayMaker 3.0's People Picker window. To link a contact to a calendar or to-do item, just drag the contact to that item.

you want to track. You define a standard item by entering some descriptive text and then setting item characteristics — priority, category, timing information, and so on — using check boxes and pull-down menus. Contact items, new in this version, have their own special format but can fall into the same categories as standard items.

DayMaker offers six ways to view the items you've entered: by day, week, month, to-do status, contact information, or as a list of items meeting search criteria that you specify (such as items containing a particular word or phrase). A series of sorting options helps you rank items within a list.

The powerful flexibility of this item-based structure is what differentiates DayMaker from its competition. You're not

will lead to the creation of a variety of modules, perhaps from third parties (although this hasn't happened yet). Also, DayMaker's method of contact management makes it easy to enter contacts and to link contact data to other items, such as to-do items and calendar entries.

In the Contact view, the DayMaker display is divided into two sections. The top section displays a list of contacts, which you can sort and search in many ways. The bottom section shows items linked to a selected contact. You can double-click on any line in the Contact view to bring up an individual record, or *contact item*, which includes fields for name, address, e-mail addresses, and as many as seven phone numbers and four customizable fields. You can assign each

DayMaker Organizer 3.0

Rating: ★★★★★

List Price: \$149; upgrade from 2.0, \$39.

Pros: Easy linking of contacts to calendar and to-do items. Flexible listing and viewing options for tasks and appointments.

Cons: Automatic phone dialing doesn't work with some office phone systems. Large file sizes.

Company: Pastel Development Corp., New York, NY; 212-941-7500.

Reader Service: Circle #404.

At Ease and At Ease for Workgroups

/ Utilities control who's in and who's out of a Mac's files and folders.

IF YOU'RE LOOKING for an inexpensive way to control access to the files and folders on a Macintosh — one that doesn't require a full-fledged security program — Apple's At Ease 2.0 or At Ease 2.0 for Workgroups may be just the ticket. Each program is a Finder alternative that's easy to set up and use, making it a solid no-frills choice for home, school, and other shared-Macintosh environments.

At Ease 2.0

At Ease 2.0 is a big improvement over its predecessor. As before, the program uses a simple file-card metaphor in place of the Finder. Each card that appears on the desktop is assigned to a user. The cards display buttons that represent the applications and documents available to that user. To open an application or document, a user simply clicks once on its button.

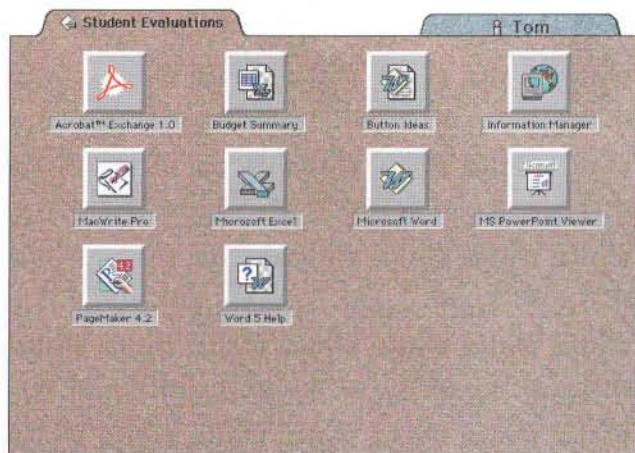
With At Ease Setup, the administrator defines the card setup for each user as well as access privileges. The original version permitted only one card setup per Mac, but with version 2.0, you can create as many as ten different setups on a single Mac — a big improvement when you have users with different needs sharing one machine.

During setup, the administrator can choose from several options. You can specify who has access to full menus within At Ease, so you can control access to Apple-menu items as well as to file commands such as Rename and Delete. You can also opt for a text-to-speech feature that prompts the Mac to "speak" button names as the cursor passes over the buttons — a great feature for kids or the visually impaired. Last, you can limit a user to opening and saving only those files within the user's folder or on a floppy disk. When appropriate, you can opt to give some users access to the normal Finder desktop.

A Font/DA-style dialog box lets you set up application-access controls. The At Ease Setup program scans the hard disk and displays a list of all applications. You select those you want to make accessible to users and click on the Add button. Unfortunately,

selecting specific documents for access control is more cumbersome. You must type in the name of each document and have At Ease search for it.

Another frustration is that you cannot



duplicate a setup and then slightly modify it, a feature provided by several other packages, such as Magna Software's Empower I. Instead, you must create each new At Ease setup from scratch — not difficult, but definitely tedious.

At Ease 2.0 for Workgroups

At Ease 2.0 for Workgroups lets you create and update as many as 200 user setups for as many as ten Macs, all from a central workstation on an AppleTalk network.

From a user's perspective, the At Ease desktop-configuration options look the same for the individual and the workgroup versions. The difference is in the setup process. With At Ease for Workgroups, you first create a list of users and then configure the card setups and assign users to groups.

Unlike the individual version of At Ease, At Ease for Workgroups lets you duplicate and modify existing setups. Also, the workgroup version includes another way to add documents to the access-control list — it can find all the documents created by a specified application. This is a bit of an improvement, but the process is still tiresome.

The workgroup version's security options are slightly more robust than the individual

version's. Administrators can require users to change their passwords after a set period of time. You can also set a minimum number of characters required for passwords. In addition, you can opt to disallow passwords that consist of a user's name, consecutive keyboard characters (asdfg), or a repeating character. At Ease for Workgroups also provides an activity log that tracks application use, user log-ins, and unsuccessful log-in attempts.

At Ease 2.0 and **At Ease 2.0 for Workgroups** each replace the Finder with a simple file-card metaphor that's tailor-made for home, school, and other shared-Macintosh environments.

The Bottom Line

Apple Computer's At Ease 2.0 and At Ease 2.0 for Workgroups are basic and easy-to-use utilities for managing file access. These two alternatives to the Finder provide a minimal first line of defense for shared-Macintosh environments that is well-conceived and affordable at the same time.
/ Tom Petaccia

At Ease 2.0

Rating: ★★★★★

List Price: \$59.

Pros: Easy setup and use.

Cons: No duplicate-setup feature. Tedious document search.

Company: Apple Computer, Inc., Cupertino, CA; 408-996-1010.

Reader Service: Circle #405.

At Ease 2.0 for Workgroups

Rating: ★★★★★

List Price: \$295 (supports 10 Macs).

Pros: Easy network setup.

Cons: Tedious document search.

Company: Apple Computer, Inc., Cupertino, CA; 408-996-1010.

Reader Service: Circle #406.

Ready,Set,Go! 6.0 / Manhattan Graphics jockeys for the middle ground in the page-layout features race.

WHAT PACKS MORE MUSCLE than an entry-level page-layout program but costs less than half the price of QuarkXPress or Aldus PageMaker? Manhattan Graphics' \$395 Ready,Set,Go! 6.0. The new Ready,Set,Go! nicely fills the price and feature-set gap between the powerhouse page-layout programs and budget entries such as Publish It! Easy and Personal Press. To the previous version's excellent typographic and color-separation controls — some of which surpass those of the high-end programs — Manhattan Graphics has added convenient floating palettes, support for multiple master pages, and enhanced trapping controls. There are several caveats, however — oddly organized menus make Ready,Set,Go! difficult to use, you can't customize the program with third-party add-ons, and a few rough edges remain.

More Palette-able

The most apparent enhancement in Ready,Set,Go! 6.0 is the addition of six floating palettes, available only if you're using System 7. Although not nearly as full-featured as QuarkXPress' or PageMaker's palettes, Ready,Set,Go!'s do provide convenient access to controls for applying style sheets, navigating documents, assigning colors, and specifying dimensions.

The one drawback is that the palettes take up more precious screen real estate than they need to. Most of them contain a fair amount of unused space and could easily be reduced. Or Manhattan Graphics could have put the empty space to better use by enlarging palette text entries or by adding more features. It would also make good conservation sense to combine the Styles palette and the Typography palette.

Ready,Set,Go!'s tool palette contains a welcome new magnifying-glass tool, along with 400-percent and 800-percent views. But here too, the program's designers could have gone further. Although you can zoom in and out with the magnifying-glass tool, as expected, you cannot select an area for magnification.

In order to speed the design process, you

can create as many as 26 left and 26 right master pages per document to handle repeating elements, such as running heads, page numbers, and rules. Ready,Set,Go! makes the process of associating a page with a master a snap. You simply click on the page's icon and then select a master page from a pop-up menu. Unfortunately, you can't assign custom names to your master pages. You are stuck with Ready,Set,Go!'s A-through-Z lettering scheme, meaning that you must rely on memory to distinguish one master page from another. For big projects, this can be a real drawback.

Prints Charming

Ready,Set,Go!'s professional-level printing features may attract many users who have outgrown their entry-level page-layout programs. For spot- or process-color separations, the program separates files in the major formats — CMYK TIFF, DCS, EPS, EPS5, RGB, RGB RIFF, and 72-dpi PICT2 — and it also separates the color graphics you create with the program's drawing tools.

Improved, ultraprecise object-level trapping is another of Ready,Set,Go!'s excellent printing features. The program supports both chokes and spreads. You'll need trapping if you plan to print on a printing press documents that contain overlapping colors. Trapping helps compensate for any misregistration on the press. With Ready,Set,

Go!, you can manually trap any object that you create with the program and you can specify the size of the trap in units as precise as .001 point.

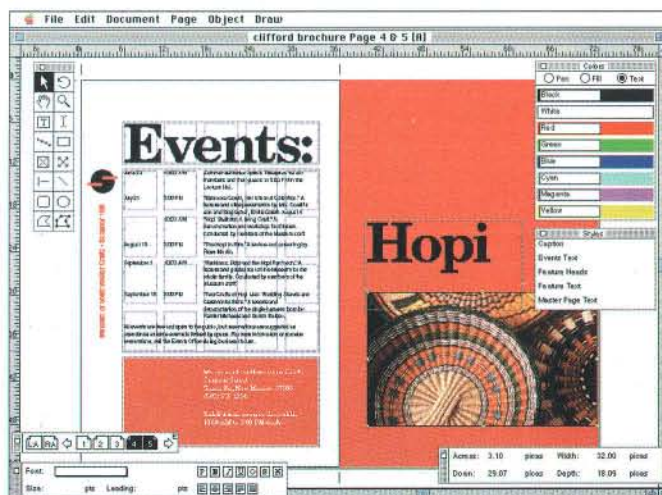
Another advanced printing feature is Ready,Set,Go!'s controls for PostScript screens. You can control the screening of a rule, a line, or a graphic-object frame as well as the interior fill of a graphic object or text block, the text itself, a gradient, or a gray-level TIFF or RIFF image. You can also specify the dot shape, screen frequency, and angle. Screens applied to individual objects override documentwide screen settings.

A new text feature is the automatic drop cap — you just specify baseline alignment, font, type style, and so on. This feature is handy, but it's not as easy to access as it should be. You won't find it on the Text menu (our first choice) or the Format menu (our second) but on the Object menu, buried in the Specifications dialog box.

Other inconveniences, such as the lack of a visual cue that shows how text blocks are linked, give Ready,Set,Go! a decidedly unpolished feel. Another problem crops up when you use white text. Because a text block's background automatically becomes white when you highlight the text, white text is impossible to read when you try to edit it.

New design features include linear and circular gradient fills. You can also have Ready,Set,Go! automatically scale text and graphics to fit exactly within a frame. In the case of text, Ready,Set,Go! adjusts the point size and horizontal scaling. Likewise, you can have the frame scaled to accommodate graphics or a block of text.

Ready,Set,Go!'s already powerful word-



A fleet of new floating palettes speeds access to Ready,Set,Go! 6.0's page-layout features.

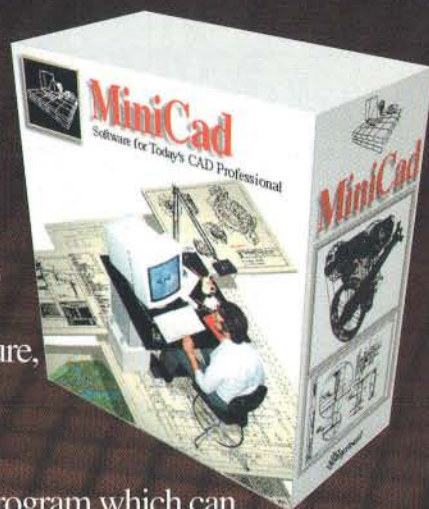
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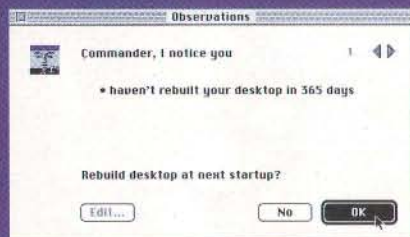
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In fact, we'll do it for you. Introducing Open Sesame!, the world's first intelligent software assistant for the Macintosh. Open Sesame! observes how you work, *learns* your repetitive patterns, and then offers to do them for you. Automatically.

With a single click, Open Sesame! will open and close related sets of folders, documents and applications, create and manage multiple Apple Menu and Desktop items folders, and perform routine maintenance, like rebuilding your desktop...automatically. So you can do more with fewer clicks.

For example, suppose that every time you start up your Macintosh you immediately open your mail program. Open Sesame! will observe this and offer to do it for you. It will even find more efficient ways for you to use System 7.0, like making aliases and stationery automatically.

Here's what the critics say: "One that knocks my socks off is called Open Sesame! ...the simple fact is that Open Sesame! works smarter for me. It might just herald a new wave in mac smartware. ...The more you use it the better it gets." The Mac Manager, *MacWEEK*

"Macintosh users who like the flexibility of System 7 but tire of "tweaking" their desktop and Apple menu items will appreciate Charles River Analytics Inc.'s Open Sesame!" *INFOWORLD*

Open Sesame! is available at these quality resellers: MacWarehouse 800-255-6227, EGGHEAD 800-EGGHEAD, The Mac Zone 800-248-0800, ComputerWare 800-326-0092.

To order direct, call 1-800-913-3535. For more information, call 617-491-3474 or fax 617-868-0780.

OPEN SESAME!

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CIRCLE 49 ON READER SERVICE CARD

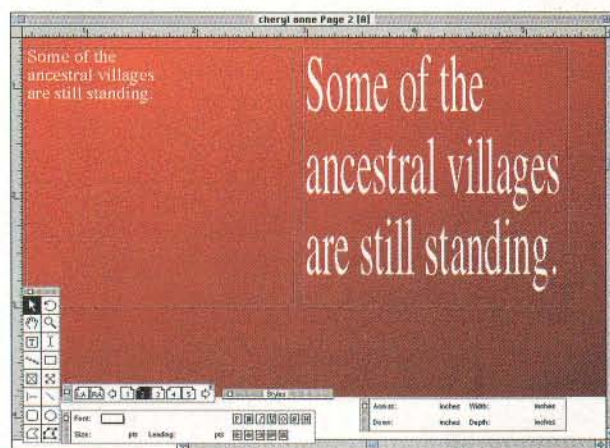
REVIEWS Page Layout

processing features include the ability to apply style sheets to individual characters, not just to whole paragraphs as in the more expensive page-layout programs. Fine control of hyphenation, kerning, and indents continues in this version too. Version 6.0 adds an enhancement that lets you specify style-sheet information for empty text frames, a helpful alternative to templates for those who divide production tasks.

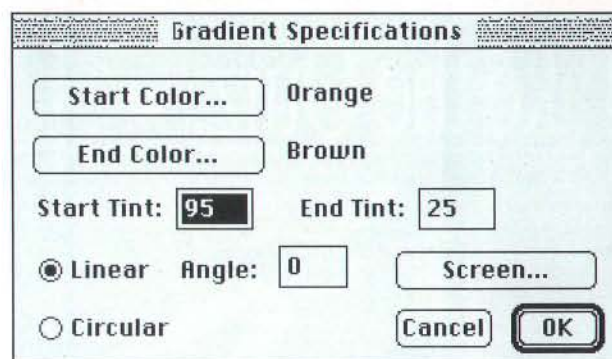
Just like the big players in the page-layout category, Ready,Set,Go! comes with several add-ons, which are called Annexes, that expand the program's feature set. It's good news, except that as we went to press, not a single Annex was available from third-party developers; for the time being, users are limited to the Annexes developed by Manhattan Graphics. The complete selection (with the exception of those that provide foreign-language support) ships with the product and includes Annexes for exporting pages in EPS format, counting words and characters, creating slide shows, and identifying the fonts used in a particular document. Overall, Ready,Set,Go!'s add-ons do not begin to match the tremendous functionality of add-ons for PageMaker and QuarkXPress.

If you use an uncommon word processor, you will appreciate Ready,Set,Go!'s newly added support for XTND technology. The program ships with 26 of the most common translators for importing and exporting formatted text. And best of all, you can now use third-party filters for formats the package doesn't support.

Ready,Set,Go! 6.0 supports System 7's publish-and-subscribe and, of less importance in a page-layout program, QuickTime. Also noteworthy is Manhattan Graphics' offer of unlimited free technical support.



A new text-handling feature allows Ready,Set,Go! 6.0 to scale text (left) so it fits within a frame (right).



Gradient-fill support is a welcome new addition to Ready,Set,Go! 6.0.

The Bottom Line

In many ways, Ready,Set,Go! 6.0 stacks up well against heavyweights Aldus PageMaker and QuarkXPress. Excellent printing and text controls abound. But an inferior interface, lack of expansion capabilities, and rough edges keep it from being a serious threat to the high-end programs. Nevertheless, for budget-conscious designers who have outgrown their entry-level page-layout programs, Ready,Set,Go!'s affordable \$395 price tag will be a decided attraction.

/ Shelley Cryan

Ready,Set,Go! 6.0.2

Rating: ★★

List Price: \$395.

Pros: Excellent printing and text controls. Unlimited free technical support.

Cons: No third-party add-ons. Awkward interface.

Company: Manhattan Graphics Corp., Hartsdale, NY; 914-725-2048.

Reader Service: Circle #407.

WE'RE REDEFINING
WHAT YOU
SHOULD EXPECT
FROM
OFFICE PRINTERS.

Citizen Notebook Printer II / Color-capable PowerBook printing companion is a sluggish performer.

AT FIRST GLANCE, the Citizen Notebook Printer II appears to be a winner. Not only is it one of the smallest and lightest of the

MacUser Labs

current crop of PowerBook-friendly portable printers but it also offers a color-cartridge option and comes with a handy built-in five-page sheet feeder. Unfortunately, glacial speed for color output combined with poorly implemented color features relegate the QuickDraw-based Notebook Printer II to second-string status.

One for the Road

Unlike most other portable printers, which use inkjet or Bubble Jet technology, the 360-

Printer II's chief rival, the color-capable Hewlett-Packard DeskWriter 310 (see review, February '94, page 61), offers a separate sheet feeder/docking station that adds considerable bulk and cost. Chalk one up for Citizen.

But the Notebook Printer II loses big points for speed. It has a painfully slow serial interface and is further hampered by a slow print engine. In our tests, using a PowerBook[®] 180 equipped with 14 megabytes of RAM, we compared the print speed of the Notebook Printer II with that of the HP DeskWriter 310. The Citizen printer took more than twice as long as the HP printer to print a black-and-white Microsoft Word document and nearly five times as long (almost three hours!) to print a color Microsoft Excel document. The speed difference between the two printers was even more dramatic when we used the HP printer's AppleTalk interface, a feature noticeably absent from the Citizen printer.

And when we factored the cost of the Notebook Printer II's color cartridge (\$7) with the inconvenience of the cartridge's incredibly short life span, the printer's color option became even less attractive. Like the HP DeskWriter 310, the Notebook Printer II is primarily a monochrome printer that's color-capable. So you can save time and money, each printer lets you switch from the cheaper and faster monochrome cartridge to a four-color (cyan, magenta, yellow, and black) cartridge. However, in our tests with highly saturated images, one Citizen cartridge barely covered an entire page and often required replacement *during* a print job.

We also experienced problems with the printer's proprietary driver, required for

color printing. The printer mysteriously powered itself off while plugged in, used the wrong colors for some graphic elements, and had trouble printing a MacDraw Pro document. In addition, we encountered a few paper jams and misfeeds with the printer's built-in multisheet feeder. When we did manage to get pages to print, output quality was a disappointment. Solid areas of color suffered from spotty coverage, and ink streaks marred unprinted areas.

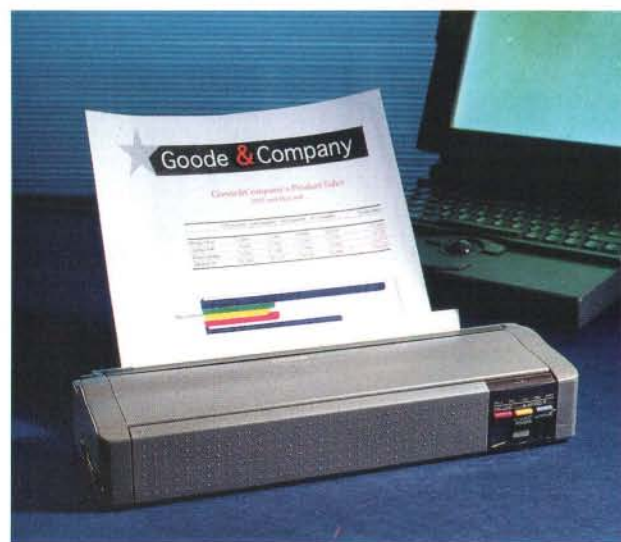
StyleWriter Mode

We also tested the Notebook Printer II in its black-and-white Apple StyleWriter emulation mode (the StyleWriter driver doesn't support color). Once we'd managed to get the printer properly configured, it performed about 20 percent faster than with Citizen's proprietary driver on our three-page Microsoft Word test document. One other benefit of the StyleWriter emulation mode is its support for Apple's GrayShare technology. But you're on your own when it comes to obtaining the Apple driver — it doesn't ship with the printer.

The Notebook Printer II comes with an impressive two-year warranty on parts and labor. A 24-hour express support service is available for \$20 per year.

The Bottom Line

With its thermal-fusion technology, the Citizen Notebook Printer II takes a unique approach to low-cost portable printing. Unfortunately, despite the pleasing small size and light weight of the Notebook Printer II, its slow speed and short-lived color cartridge are major stumbling blocks. Considering the fierce competition in the portable-printer class posed by the HP DeskWriter 310, the only trip we can recommend for the Notebook Printer II is one that leads back to the drawing board. / Anita Epler



The Citizen Notebook Printer II is small enough to fit easily into a briefcase but is compromised by slow speed and poorly designed color features.

dpi Notebook Printer II uses thermal-fusion technology. The ink, stored in a small cartridge similar in size and appearance to an audio minicassette, is transferred to paper via a small thermal print head.

Weighing just 2.6 pounds with battery pack (2.2 pounds without) and measuring 12 x 4 x 2 inches, the Citizen Notebook Printer II fits easily in a briefcase or carry-on bag. The battery pack prints 30 to 50 pages on a single charge. It includes a built-in five-page sheet feeder, rare among portable printers. By contrast, the Notebook

Citizen Notebook Printer II

Rating: ★★

List Price: \$399.

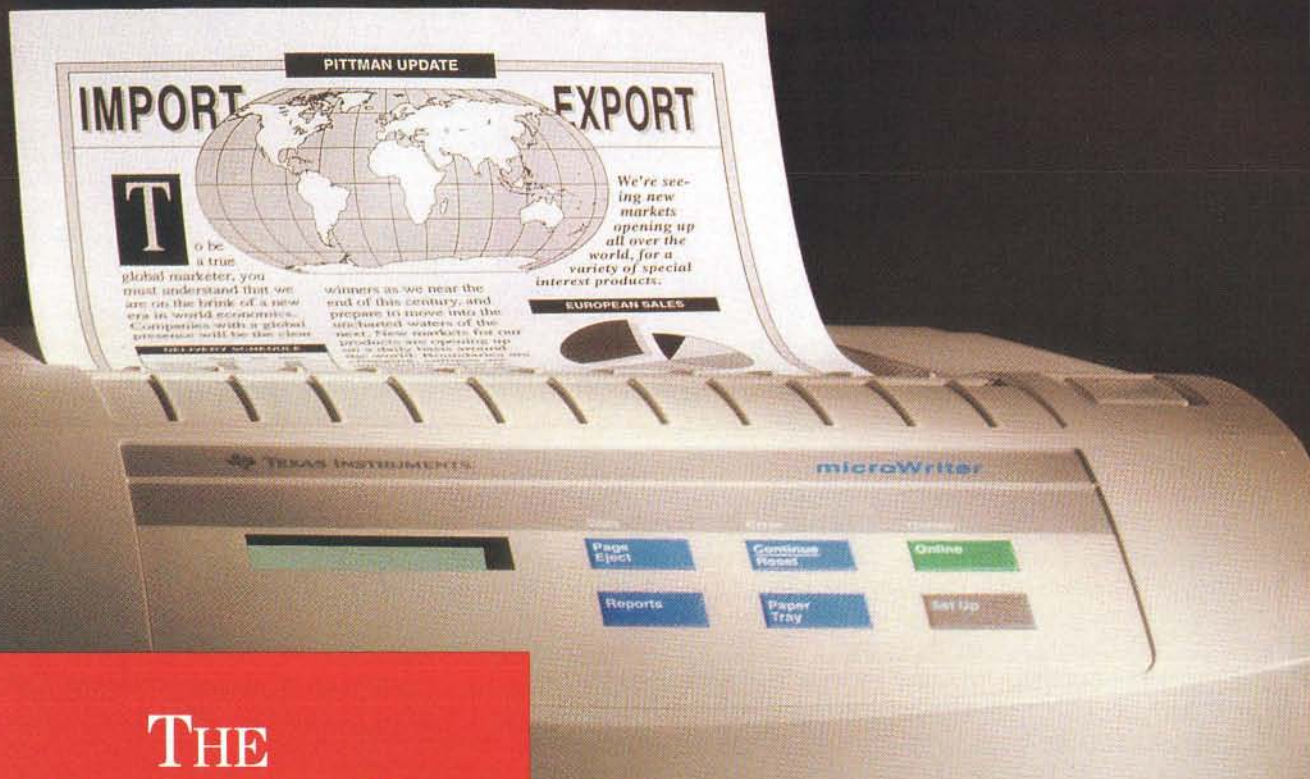
Pros: Compact and lightweight. Built-in sheet feeder.

Cons: Slow. Poorly implemented color features.

Company: Citizen America Corp., Santa Monica, CA; 800-477-4683 or 310-453-0614.

Reader Service: Circle #408.

Flexibility (flek·sə·'bil·ət·ē) *n.* 1, A feature previously not found in this category. *example:* For under \$800, **TI microWriter™** printers with **Adobe® PostScript®** give you more networking and paper handling *flexibility* than Apple and HP, at a lot lower price.



THE UNDER \$800 PRINTER, REDEFINED.

| | TI microWriter PS23 | Apple LaserWriter Select 310 | HP 4ML |
|--------------------------|--------------------------------------|---------------------------------|-------------------------|
| Print Speed | 5 ppm | 5 ppm | 4 ppm |
| AppleTalk® Connection | Standard | Not Avail. | Standard |
| Paper Trays | (std.) 250 sheet (opt.) 250 sheet | 250 sheet 250 sheet | 100 sheet Not Avail. |
| Auto Emulation Switching | Standard | Not Avail. | Standard |
| List Price | \$ 799 | \$ 1079 | \$ 1279 |

If you're looking for a PostScript printer with a street price well under \$800, you'll have a hard time finding one with as many features as a TI microWriter.

Just look at the chart and compare it to our leading competitors, Apple and HP. Then, when you're ready for a full-featured printer that's truly flexible, at a price that's truly affordable, take a look at a TI microWriter. For more information or a dealer near you, call 1-800-527-3500.

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CIRCLE 138 ON READER SERVICE CARD

Compatibility (kəm·pat·ə·'bil·ət·ē) *n.* 1, A feature typically lacking in this category. *example:* The new **600 dpi TI microLaser™ Pro 600** printer gives you Mac®, DOS, Windows, PostScript® and PCL5 *compatibility* standard; Apple and HP charge hundreds more.



Adobe PostScript

Specifications in chart are based on information as of 12/93. *Estimated dealer price including manufacturer's rebate is under \$1400. Dealer prices may vary.
† At 4% coverage. ‡ Rebate applies to PS23 model. microLaser and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packard, Inc. Mac is a registered trademark of Apple Computer, Inc. © 1993 TI.

THE UNDER \$1400 PRINTER, REDEFINED.

If you're looking for a true 600 dpi printer with a street price under \$1400*, you'll have a tough time beating the new TI microLaser Pro 600.

You see, when we set out to design the ideal office printer, we began by asking thousands of users what they wanted most. And then, instead of making those "key care-about" optional, we made them standard.

Take print quality. We began with true 600 dpi resolution. And then enhanced it with 6MB of memory for improved graphics. Compatibility? We're Mac®, DOS and Windows compatible right out of the box. With all the right languages and interfaces. And with the intelligence to switch these automatically, depending on the environment. Connectivity? All popular protocols are supported with a single network option board.

Low maintenance? Our new toner cartridge typically gives you 15,000 pages between changes. Paper handling? Two 250-sheet trays come standard. And finally, value. Take a look at the chart below, compare features and price, and your choice should be simple.

We invite you to try the new TI microLaser Pro 600. For additional information or a dealer near you, call **1-800-527-3500**.

Ask
About Our \$60
End User
Rebate.*

| | TI microLaser Pro 600 | Apple LW Pro 600 | HP LaserJet 4M |
|---------------------------------|------------------------------|-----------------------------|------------------------------|
| <i>True 600 dpi</i> | Yes | Yes | Yes |
| <i>Speed/Processor</i> | 8 ppm / RISC | 8 ppm / 68030 | 8 ppm / RISC |
| <i>Emulations</i> | PCL5/ Adobe® PostScript 2 | PCL4/ Adobe PostScript 2 | PCL5E/ Adobe PostScript 2 |
| <i>Compatibility</i> | Mac/DOS | Mac/DOS | Mac/DOS |
| <i>Toner Cart. Life</i> | 15K pages† | 6K pages | 6K pages |
| <i>Paper Trays</i> | 250 sheet/ 250 sheet | 250 sheet/ 100 sheet | 250 sheet/ 100 sheet |
| <i>Auto Language Switching</i> | Yes | No | Yes |
| <i>Auto Interface Switching</i> | Yes | Yes | Yes |
| <i>40MHz Processor Upgrade</i> | Optional | Not Avail. | Not Avail. |
| <i>List Price</i> | \$1599* | \$2099 | \$2479 |

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CIRCLE 139 ON READER SERVICE CARD

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3923 Coconut Palm Dr., Suite 111
Tampa, FL 33619

E-Machines EtherDock / Docking station delivers versatility and fast network connections to Duo owners.

POWERBOOK DUO OWNERS who are searching for a portable dock with speedy network connections need look no further

MacUser Labs

than the E-Machines EtherDock. The EtherDock is currently the only portable dock that adds Ethernet support to a variety of other expansion options, providing flexibility for Duo owners on the road and in the office.

No One-Trick Pony

The EtherDock's 10BASE-T Ethernet support sets the dock apart from competing docks and offers Duo owners a faster alternative to the Duo's built-in LocalTalk connection. But the 1.24-pound, \$699 EtherDock is no one-trick pony. It also comes with an HDI-20 floppy-disk port, an ADB port for an external keyboard and/or a mouse, 8-bit-color-video support for many large-screen monitors, two serial ports for LocalTalk and external-modem connections, an HDI-30 SCSI port, sound-in and -out connectors, and a security-cable slot.

The EtherDock's specifications are nearly identical to those of Apple's Duo MiniDock, with two exceptions. The Duo MiniDock lacks a 10BASE-T Ethernet port, but it does provide a pass-through-modem port for use with either Apple's PowerBook Express Modem or Global Village's PowerPort/Mercury for the Duo. That's a good thing, because the Duo MiniDock, like the EtherDock, fits over the Duo's modem port. The EtherDock lacks a pass-through-modem port — a serious drawback if you've already purchased an internal modem.

E-Machines provides several troubleshooting utilities with the EtherDock, including Network Diagnostics and Network Snooper software for diagnosing problems with the dock's Ethernet functions. Additional utilities include video software that lets you connect your Duo to a variety of

external monitors and control mirroring between your Duo's monitor and the external monitor. The video software is especially handy when you are using your Duo to display presentations on a large-screen monitor.

We tested the EtherDock, teamed with a PowerBook Duo 230, at home, in the office, and on the road. The dock performed reliably and consistently for most of our network-based applications. Most important, its Ethernet support made operations over the network really scream. For example, we

were able to copy some files six times as fast as with LocalTalk.

At test time, we were not able to use either EtherPeek or NetMinder Ethernet to observe network traffic with our EtherDock-equipped Duo. However, interface files that enable you to work with these net-



Ethernet support sets the EtherDock apart from its competition.

work-management programs should be available by the time this review appears.

The Bottom Line

At \$699, SuperMac's E-Machines EtherDock is a solid value for those who are looking for a way to transform their Duos into fully functional desktop machines with Ethernet support. Furthermore, the dock's 8-bit-color-video capabilities on large-screen monitors will be especially attractive to those who frequently travel to give business presentations. / Mark Bieler

E-Machines EtherDock

Rating: ★★★★★

List Price: \$699.

Pros: 10BASE-T Ethernet support.

Cons: No pass-through-modem port. Lacks support for network-management tools.

Company: SuperMac, E-Machines Division, Sunnyvale, CA; 800-344-7274 or 408-541-6100.

Reader Service: Circle #409.

Satisfaction (*sat·əs·fak·shən*) *n.* 1, A feature previously left to chance in the purchase of a printer. *example:* When you buy a new TI printer*, your **satisfaction** is **guaranteed** or call TI within 30 days and we'll take it back.



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and every printer we make. And even after the 30 days, you can continue to call the 800 number for any help you may need.

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DEALERS CIRCLE 95 ON READER SERVICE CARD
END USERS CIRCLE 94 ON READER SERVICE CARD

CrossTalk for Macintosh / DCA's first telecommunications program for the Mac gets off to a strong start.

WITH THREE POWERFUL telecommunications programs already available for the Mac, why consider another? DCA, a big player on the Windows side of the telecommunications arena, has the answer. Debuting with version 2.0 to match its Windows counterpart, CrossTalk for Macintosh offers a more comprehensive set of telecommunications protocols and emulators than its three main competitors — White Knight, Hayes Smartcom, and MicroPhone Pro. Add a hefty scripting language, cross-platform compatibility, and basic Apple-events support, and DCA has a telecommunications newcomer well worth considering.

Well Connected

If you can't connect to a host computer with CrossTalk, you probably can't connect to it with a Mac at all. In addition to all the standard terminal emulations — Color ANSI PC, IBM 3101, Televideo 912/920/925, TTY, and VT52/100/102/220/320 — CrossTalk

of the Macintosh Communications Toolbox as a telecommunications engine, which enables DCA to add emulations and protocols by simply plugging in modules.

Although it doesn't use a proprietary graphical interface like that of First Class or CompuServe Information Manager, CrossTalk provides nearly point-and-click telecommunications functionality. It's easy to connect to a service — 13 prescribed session files for such popular communications services as AT&T Mail, CompuServe, Delphi, Dow Jones, GENie, and Lexis are included in the package.

The first time you use these files, the program guides you through a wonderfully scripted series of dialog boxes as you fill in your vital telecommunications statistics — local phone number, log-on ID, password, and so on. The program saves the information to a log-on script and uses it in subsequent sessions. CrossTalk also includes a Create New Session script, which guides you

through a similar process for logging on to your local BBS.

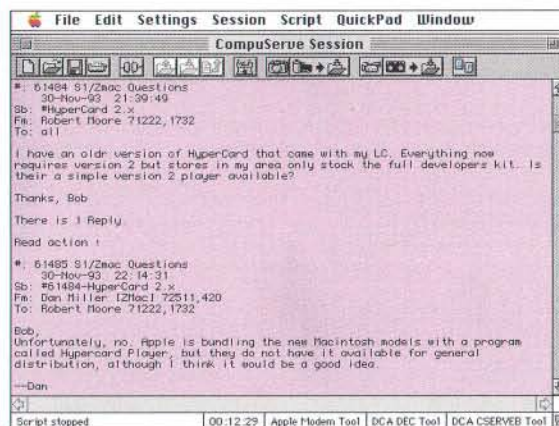
Once you've logged on to a service, CrossTalk provides more time-saving shortcuts. An icon bar lets you quickly perform common tasks such as opening and saving files, capturing text, and uploading and downloading files.

You can devise your own shortcuts as well, with CrossTalk's customizable QuickPads — separate windows that contain text and icon buttons you've created to trigger a sequence of key-

strokes (GO NEWS, for example) or to run external or embedded scripts. You can even import PICTs to enhance the appearance of your QuickPads.

Powerful Scripting Language

To say CrossTalk for Macintosh has a scripting language doesn't do it justice. The program boasts a full-blown programming environment called the CrossTalk Application



For fast access to common commands, CrossTalk provides an icon bar at the top of session windows.

provides a slew of others, including ADDS ViewPoint+, Hazeltine 1500, HP 700/94, Lear-Siegler ADM3a, and PC-TERM.

The program provides the same comprehensive support for file-transfer protocols. You can choose from CompuServe B+/QuickB, Kermit, straight ASCII (text), IBM IND\$FILE, Zmodem, and the various flavors of Xmodem and Ymodem.

CrossTalk's versatility stems from its use

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CIRCLE 90 ON READER SERVICE CARD



RASTEROPS PAINTBOARD 24-BIT DISPLAY SOLUTIONS MAKE QUITE AN IMPRESSION.



No matter how well you've mastered technique, the wrong display can obscure the subtleties.

That's why RasterOps makes display solutions for every style and budget.



Degas undoubtedly would've been impressed with the 20T Multiscan Color Display for picture-perfect accuracy, paired with the PaintBoard Professional™ and RasterOps DSPro™, a Photoshop™ accelerator daughtercard. On the other hand, Mondrian might have found the RasterOps 20/20 Multimode Color Display and PaintBoard Lightning™ accelerated graphics card a perfect fit for his straight lines and sparse color.

Both would be able to choose from the same 16.7 million color palette. And the competitive price means neither has to be a starving artist.

Portrait of an industry leader

The first company to deliver Macintosh® 24-bit color is a world leader in workstation-performance color. We're in our fourth generation of QuickDraw™ acceleration technology — achieving performance increases of up to 4400%. Check the chart below, and you'll find a display solution that brings lifelike — and fast — color to your desktop.



The PaintBoard™ line offers single-slot photorealistic 24-bit big-canvas color, multiple resolutions and reliable acceleration for every graphic artist's needs.

There's an impressive display at a dealer near you. To find out where, call **1-800-SAY-COLOR.**

| | | PAINTBOARD 24-BIT COLOR GRAPHIC ACCELERATOR CARDS | | | |
|--------------------------|---|---|---------------------|------------------|--------------------|
| | | PROFESSIONAL \$2,199* | TURBO XL \$1,399 | TURBO \$1,199 | LIGHTNING \$999 |
| RASTEROPS COLOR DISPLAYS | RasterOps 21" Color [1152 x 870] • \$2,749 | ■ | ■ | | |
| | RasterOps 20T Trinitron Multiscan Color [1024 x 768] • \$2,869 | ■ | ■ | ■ | ■ |
| | RasterOps 20/20 Multimode Color [1024 x 768] • \$1,869 | ■ | ■ | ■ | ■ |
| | RasterOps Sweet 16 Color [832 x 624] • \$1,099 | ■ | ■ | ■ | ■ |

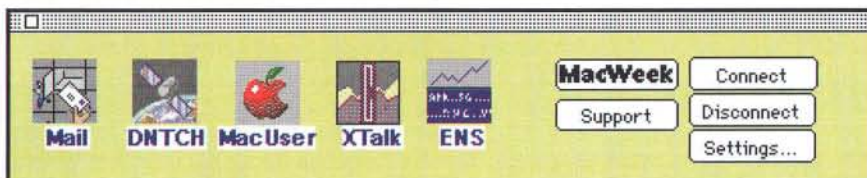
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*Price does not include RasterOps DSPro card. All prices are US suggested retail.

CIRCLE 63 ON READER SERVICE CARD



CrossTalk's QuickPads contain buttons that trigger keystroke sequences or run scripts.

Script Language (CASL). The powerful CASL is aimed at expert users, but even experienced White Knight and MicroPhone scripters may find that CASL presents a fairly steep learning curve. With CASL, systems professionals can create custom scripts for corporate users that filter text, transfer files, control cursor movements, present input dialog boxes, and more.

Unfortunately, the only way to create custom scripts is with CASL's text-editing window. CrossTalk lacks the graphical script-building environment provided by rivals White Knight, MicroPhone, and Smartcom.

For those who are not up to mastering a scripting language, CrossTalk provides a Learn facility, which records your keystrokes and creates scripts automatically. The Learn facility works well for the most frequently used wait-and-reply scripts.

You can easily exchange CrossTalk sessions, QuickPads, and scripts with the Windows version of the program. Only those items associated with filenames conventions require modification. Of course, icons and graphics don't transfer between the two versions.

Apple-events aficionados will welcome CrossTalk's support for the four basic Apple-events commands (Open, Save, Print, Quit) as well as for DoScript commands. The latter let you control CrossTalk with macro and scripting programs such as AppleScript, Frontier, and QuickKeys as well as with other applications.

CrossTalk 2.0 has no major flaws, but it does lack several features and suffers from some minor inconveniences. The most frustrating omission is automatic text wrap in uploaded and pasted text. As you're composing messages off-line, you must enter a carriage return at the end of each line. In addition, because DCA has mapped the Page Up, Page Down, Home, and End keys for specific functions, you can't use those keys to navigate session windows. And the session window lacks a Search command.

We also encountered several minor bugs. You can't search for a specific topic in on-line

help while you're working on-line — all of your search strings end up in the session window. Another bug in the QuickPad Editor limits the background color to white for all text objects.

Last, a default setting makes resizing the session window an adventure. Hint: You must first deselect the Autosize Font option in the Terminal Settings dialog box. According to the company, these bugs will be corrected in an update to the program that may be available by the time this review appears.

Fortunately, the excellent quality of DCA's technical support helps offset these imperfections. The company provides a direct tech-support phone line, and you can reach DCA through the DCA BBS or CompuServe.

As an industrial-strength telecommunications environment, CrossTalk comes with a rather prodigious appetite for RAM and disk space. It requires System 7 and a Mac equipped with at least 4 megabytes of RAM (we recommend more). Depending on the installation options you choose, you'll need 2 to 5 megabytes of disk space.

The Bottom Line

CrossTalk for Macintosh is a welcome addition to the Mac's family of telecommunications programs. Chock-full of sophisticated tools to warm the hearts of experts, it also comes with a slew of prescribed session files to help inexperienced users connect to most popular communication services. If DCA can smooth the rough edges of the initial release, CrossTalk may well find itself the leader of the pack. / Tom Petaccia

CrossTalk for Macintosh 2.0

Rating: ★★★★★

List Price: \$195.

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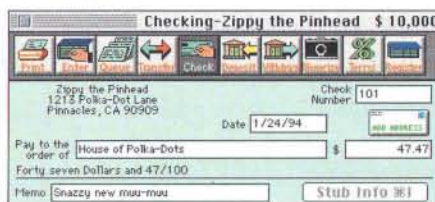
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CheckWriter Pro 6.0 / Friendly personal finance

YOU DON'T HAVE TO BE A CPA to use CheckWriter Pro 6.0, from Aatrix. Recently beefed up with investment features that bring it closer to its main competitor, Intuit's Quicken, CheckWriter Pro also features a notably novice-friendly attitude.

Taking Stock. With its newly added investment features (brought over from Aatrix's Hi! Finance), CheckWriter Pro goes further than Quicken in some ways. It lets you monitor changing stock quotes and can automatically download quotes from on-line services.

The Buddy System. CheckWriter Pro offers an informal, friendly approach geared to novices. Its manual avoids accounting terms in favor of basic, concise explanations (three pages to explain check-register balancing, for example, versus Quicken's ten). Reminders of impending bills are another friendly feature, as is the program's exceptional variety of tools for budgeting tasks such as planning for college costs, calculating a loan, and buying insurance. CheckWriter Pro also makes it



easy to quickly format output for personal checks. It took us only 15 minutes to create a template from scratch that worked perfectly with bank checks from a personal checkbook.

Business Bonuses. For small businesses, CheckWriter Pro offers such features as a simple but complete inventory system and a way to produce invoices. The latter even lets you attach a sound, a PICT file, or a QuickTime movie as part of an inventory item's description.

Less Than Perfect. CheckWriter Pro has its weaknesses. Its interface, revamped greatly in version 5.0, still isn't as efficient as Quicken's — many functions are in separate windows, requiring lots of mouse clicks. The lack of a charting function is a notable minus as well.

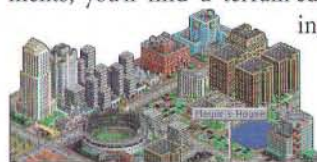
Still, although CheckWriter Pro lacks Quicken's efficient interface and snazzy charts, the program's novice-friendly approach, economical check printing, and unique billing and inventory features may make it the right financial program for you. / **Thom Holmes**

CheckWriter Pro 6.0 ★★★★★ / **List Price:** \$79. **Company:** Aatrix Software, Inc., Grand Forks, ND; 800-426-0854 or 701-746-6801. **Reader Service:** Circle #411.

SimCity 2000 / More fun than original Sim

IN A MOVE BOTH NOSTALGIC and forward-thinking, Maxis has released SimCity 2000, a spectacular revision of its first simulation game, SimCity. As before, your job as mayor is to lay out zones for industry, commerce, and residence; fling down roads and rail; supply a bit of power; tax the poor citizen schmoes; and hope your city grows and prospers as the simulation runs its course. But Maxis has added new challenges — and more visual entertainment.

Urban Renewal. First, the interface is no longer a flat, overhead view of your domain. Cityscapes are presented in 3-D, at a 45-degree angle. The structures are also more varied. For example, commercial high-rises are no longer just boxlike structures labeled "C"; they can be anything from Cassidy's red-brick toy store to the baby-blue corporate headquarters of KSIM. Along with these visual enhancements, you'll find a terrain editor (including controls for adjusting



altitude); preset scenarios to be completed by a certain time;

subway and water systems; libraries, zoos, and prisons; on-screen advisors; the ability to issue

bonds; and many savory rewards for the successful mayor. **Tough New Challenges.** With these new features comes more complexity. The road-versus-rail decision, for instance, now includes the thorny issue of location. If train and subway stations aren't conveniently placed, your citizens may boycott the system. Or take the library issue. Without enough public libraries, the Sim citizens will dumb down — and then the intellectual pool of your city won't be deep enough to attract high-tech industries.

Aside from one small but irritating omission — there's no Undo command, so you may pay big bucks to replace a mistakenly bulldozed structure — SimCity 2000 should delight Sim veterans and newcomers alike. It's Simply too much fun. / **Christopher Breen**

SimCity 2000 1.0 ★★★★★ / **List Price:** \$69.95. **Company:** Maxis, Orinda, CA; 510-254-9700. **Reader Service:** Circle #412.

Thinkin' Things / Brain-building games

CHILDREN MAY NOT THINK THE WORDS *thinking* and *fun* have much to do with each other — until they discover Thinkin' Things, from Edmark. The six learning activities in this program give 4-to-8-year-olds a head start with memory, critical thinking, problem solving, and creativity. They are also way more fun than you'd expect.

Frolicsome Logic. In Oranga Banga, a friendly orangutan with a drum set helps children develop auditory and visual discrimination and memory. Friddle Shop asks children to help a series of comical customers select specific Friddles according to such attributes as curly hair and purple stripes; in the process, players learn to recognize AND, OR, and NOT (Boolean logic) relationships. Feathered Friends asks children to create birds with the right characteristics to complete a series. In Toony Loon, children improvise or match musical patterns on some *very* unusual xylophones to increase memory and musical skills.

Each of these four activities has a Create mode as well as a more directed Question & Answer mode, in which the program adjusts the difficulty of the questions automatically. (An adult section lets you set the initial difficulty level.) Used with Edmark's KidDesk, the program can track levels for more than one child at a time.

Better Than Lava Lamps. Two more activities, Flying Spheres and Flying Shapes, help children develop spatial awareness as they select shapes and set them into motion — creating colorful, sound-enhanced kinetic art. Our student testers liked these activities best of all, and even adults find them hard to resist.

Thinkin' Things epitomizes our definition of the ideal toy: While promoting thinking skills, it entertains the child in all of us. / **Doug and Denise Green**



Thinkin' Things 1.0 ★★★★★ / **List Price:** \$59.95; school version, \$69.95 (includes lesson plans). **Company:** Edmark Corp., Redmond, WA; 206-556-8484. **Reader Service:** Circle #413.

SITcomm / End telecommunications frustration

ALADDIN SYSTEMS HAS BROUGHT a breath of fresh air to telecommunications software, with SITcomm. SITcomm gently nudges novice modem users into the mainstream with an extremely well written manual and a simple user interface while providing powerful features that stay out of the way until they're needed.

Click 'n' Connect. SITcomm's main window, which displays incoming and outgoing communications, has a handy floating tool bar with buttons for every major function in the program — including the useful address book. The address book lets you store all the information you need for smooth connection to remote computers and your favorite on-line services and BBSs. If you want to change any of this information on the fly, you can do so directly from the tool bar. The tool bar also lets you access a notepad for general notes as well as one for each address-book entry.

SITcomm handles compression well. You can stuff or unstuff files within the program, which itself needs only 500K of RAM and 600K of disk space (roughly half of what its main competitors require).

Cool Tools. Modem setup is another area that SITcomm aims to simplify. SITcomm's enhancement of version 1.5 of Apple's new Modem Tool (the software that lets you use your modem to make remote connections) adds support for the most-popular modems — so you

don't need to enter arcane setup-string information. The company has even provided a cabling diagram for each supported modem. Plus, Aladdin's versions of the other standard telecommunications tools — terminal emulators, the text tool, and so on — are more powerful, easier to use, and less memory-consuming than Apple's. **Power-User Perks.** When you need power, SITcomm obliges. A long list of translators for various compression schemes and file formats from other platforms makes it virtually impossible to send or receive a document that can't be opened. SITcomm also accommodates scripting: It includes a run-time version of UserLand's Frontier, plus some sample macros and suggestions for AppleScript users. You can use either AppleScript or Frontier to make SITcomm react to prompts from other software and learn and automate complicated and repetitive tasks.

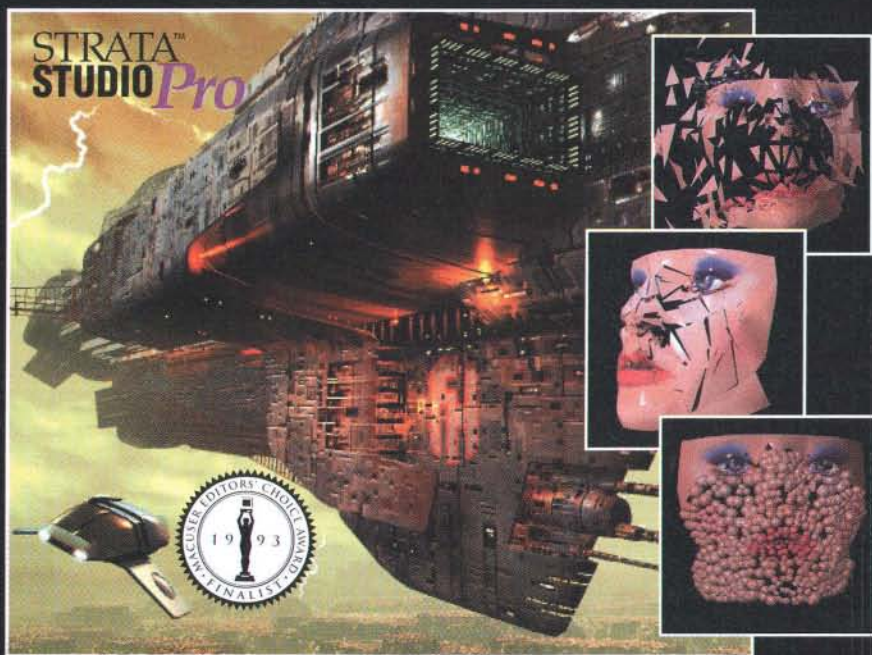
Reliance on external scripting software is SITcomm's only real drawback. Competitors Smartcom and MicroPhone can learn and automate user actions on their own — but their capabilities are also more limited than SITcomm's (at least until Smartcom II, version 4 comes out). And because SITcomm knows the sign-on routines for a comprehensive list of popular BBSs and information services, it doesn't need to watch your actions to develop sign-on scripts.

Finally, the program is solid and dependable. So if you've been waiting for a truly easy telecommunications program that doesn't sacrifice power, sit down with SITcomm. / Ken Gruberman

SITcomm 1.0 ★★★★★ / List Price: \$120. Company: Aladdin Systems, Watsonville, CA; 408-761-6200. Reader Service: Circle #414



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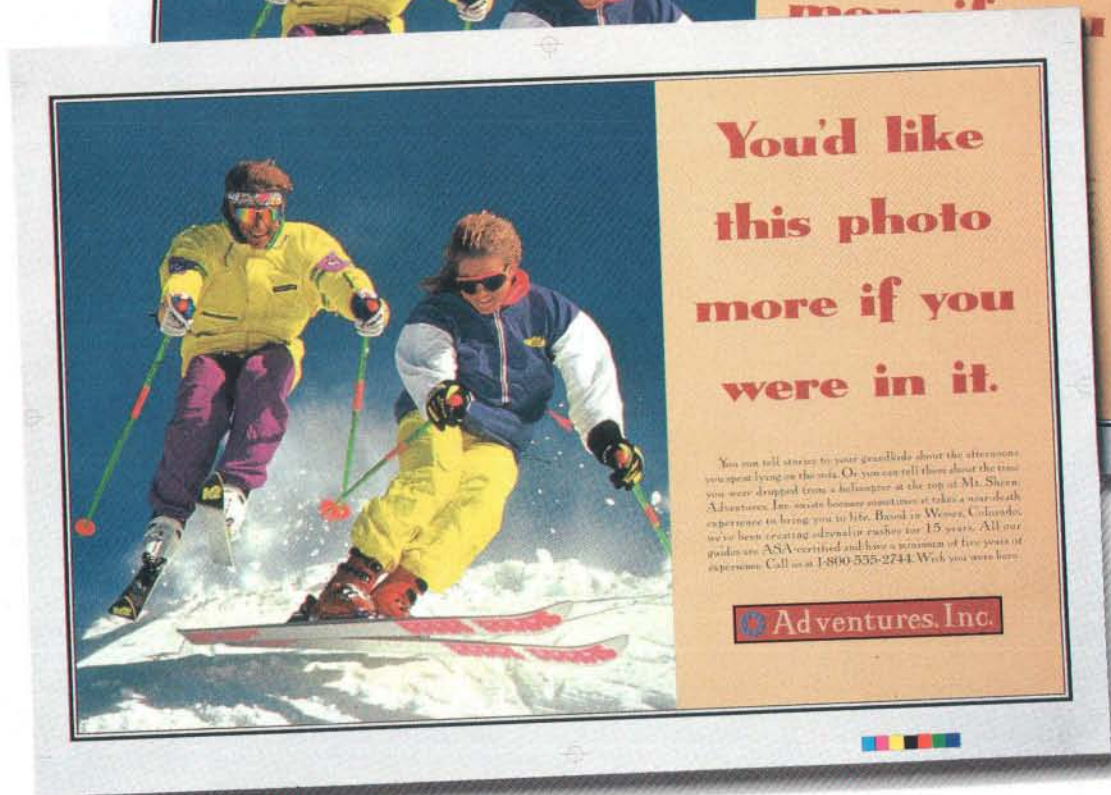
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CDU (Connectix Desktop Utilities)

/ Productivity, protection, and power savings

FOLLOWING ON THE SUCCESS OF CPU, its PowerBook-utility collection, Connectix has unveiled the \$99 CDU (Connectix Desktop Utilities). Accessible from a pull-down menu on the menu bar, CDU's modules perform basic keyboard-automation, desktop-enhancement, security, power-saving, and file-syncing tasks.

Keyboard Shortcuts. CDU's five keyboard-automation modules are like a "lite" version of CE Software's QuickKeys. The Hot Keys module lets you define key combinations that open files or applications or type a sequence of characters. App Manager, Balloon Help, and Extended Keys provide keyboard shortcuts for cycling through open applications, turning Balloon Help on and off, and performing function-key actions from a nonextended keyboard. Keyboard Power is the most novel module: It lets you navigate menus and dialog boxes by using keyboard controls. We found these controls useful, but a conflict with Now Software's NowMenus kept them from working correctly until we made sure CDU loaded last during startup.

You can also use keyboard controls to navigate CDU's own menu, which provides quick ways to set sound levels and the monitor's bit depth and toggle System 7 file sharing on and off. Unfortunately, this menu lacks toggles for network or remote-access settings.

Desktop Enhancement. CDU provides three desktop-enhancement modules. The Desktop module lets you dress up your desktop with pictures or predesigned color schemes (none of which wowed us). The Cursors module lets you enlarge the I-beam and easily locate the

arrow pointer. The Display module is more useful: It lets you configure CDU's menu-bar clock to show the time, the date, disk activity, or how much space is available on your hard disk.

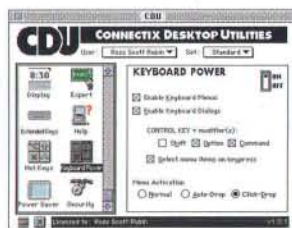
CPU Legacies. The other CDU modules address mobile-user concerns that apply to some desktop-computer users too. The Security module presents a password dialog box at startup that can foil casual

snoopers. Power Saver can reduce your Mac's electricity use by dimming the monitor or turning the machine off after a preset idle period. Easy Sync helps you synchronize files between your Mac's hard disk and other disks. And Sets and Users lets you create different CDU

settings for different users or different situations, such as home and office (in case you lug your desktop Mac between the two?).

To us, some of CDU's features seem geared more to mobile users than to deskbound ones. Also, much of what the collection does is addressed as well or better by shareware or other, more specialized utilities packages. Still, CDU provides a satisfying taste of keyboard automation, desktop enhancement, security, and file synchronization in one package. It can serve as a useful companion for novice users on a budget. / Ross Scott Rubin

CDU (Connectix Desktop Utilities) 1.0.1 ★★★ / List Price: \$99. Company: Connectix, San Mateo, CA; 800-950-5880 or 415-571-5100. Reader Service: Circle #415.



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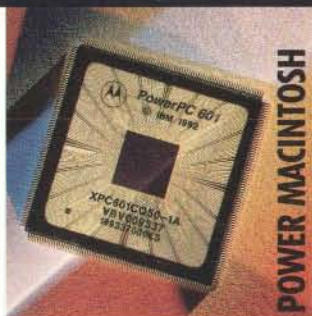
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POWER MACS:

Full Speed Ahead

APPLE'S FINALLY PLAYING HARDBALL. It's fed up — fed up with users defecting to Microsoft Windows on inexpensive PCs, fed up with the popular press raving over Intel's Pentium chip, fed up with settling for second place in the personal-computer race. With the introduction of the Power Macintosh line, Apple's fighting back — hard.

And now it has all the right moves.

Apple's Power Macs deserve their name. Thanks to the muscular PowerPC 601 RISC microprocessor — the first in a line of new chips from the Apple/IBM/

MacUser Labs

Motorola alliance — a Power Mac's speed can be two to five times that of Apple's previous top-of-the-line Mac, the Quadra 840AV.

And to protect your past investments, all three Power Macs — the 6100/60, the 7100/66, and the 8100/80 — can run your current software and can work seamlessly with existing hard drives, printers, scanners, and other peripherals.

In a direct challenge to the makers of cheap but fast PCs and PC clones, Apple no longer charges a premium for top performance. For around \$2,000, you can take home a Power Mac 6100/60 and a mouse, a keyboard, and a 14-inch color monitor. Even the high-end 8100/80 is aggressively priced, costing about \$4,000 in its basic configuration, with no monitor or keyboard — that's about the price you'd pay for a Quadra 800 with 8 megabytes of RAM and a 1-gigabyte hard drive.

**By Henry Bortman, Cheryl England,
and Stephan Somogyi**



And finally, Apple is admitting that some people want — or at least *need* — to use Windows. SoftWindows, a new program from Insignia Solutions, lets you run Windows software on the Power Macs at speeds rivaling those of a 486SX PC — fast enough to satisfy most business users. The Power Macs' all-in-one combination of high speed, low price, and the ability to run both Mac and Windows operating systems may lure users — and particularly corporate users — into the Macintosh fold.

Sounds good, but if you feel a bit like you did on your first date — excited, expectant, but a little skeptical — we don't blame you. Apple's Power Macs have hit the streets (or really, dealers' shelves) full of promises that seem too good to be true. To find out whether Apple has really delivered the goods, MacUser Labs tested near-final versions of all three Power Macs. Here's our in-depth report.

Family Resemblances

Although the Power Macs represent a new generation of the Macintosh, much about them will be familiar to you. They're the culmination of much that was technologically good in previous Macs along with the single biggest technical advance in Apple's history — the PowerPC chip.

First, the Power Mac 6100/60, 7100/66, and 8100/80 have the same industrial designs as the Mac Quadra 610, 650, and 800, respectively. Second, as with many previous Macs, Apple is offering complete logic-board upgrades for owners of older Macs based on these three designs. And, as we went to press, Apple announced its intention to provide Power Mac upgrades for the Quadra 605 and several LC and Performa all-in-one models; these upgrades won't be

available until next year, however. (For the full story on currently available upgrade options, see "Upgrades: From Mac to Power Mac," in this issue.)

The Power Macs also come standard with many features that were optional on older Macs or available only on the most expensive models. For instance, for about \$300 extra, you can purchase any of the Power Macs with an AV card that supports video in a window and full-motion video-in and -out. (The AV card does not include an expensive DSP chip, as do the Quadra 660AV and the Quadra 840AV; instead, the PowerPC chip handles DSP-type functions such as speech recognition.)

And, no matter which Power Mac configuration you buy, you get at least 8 megabytes of RAM — Apple's way of admitting that you and your Mac can't function efficiently with less. A new version of system software (System 7.1.2) is bundled with AppleScript, PC Exchange, PlainTalk text-to-speech software, and new versions of QuickTime and PlainTalk speech-recognition software that have been converted to take advantage of the PowerPC chip. There's also support for software-based fax-modem telecommunications.

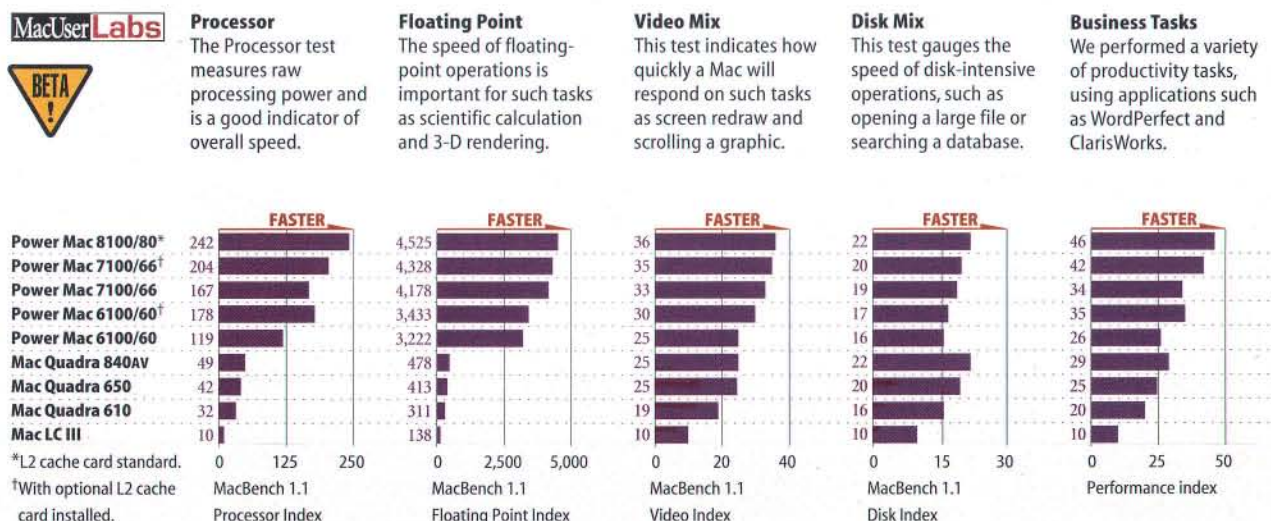
Some ideas that were conceptually clever but poorly implemented in older Macs — internal video, for example — have been successfully reworked for the Power Macs. The IIfx was the first Mac that could drive a monitor without requiring additional hardware, but to do so, it used system memory (RAM) instead of specialized video memory (VRAM). This scheme helped reduce the cost of the IIfx but drew criticism when users discovered noticeable performance degradation when a monitor was plugged in to the IIfx's video port instead of in to one on a NuBus video card. Although the Power Macs'

figure 1

The Power of Power Macintosh

Not just another Mac. Speed is one of the main differences between Power Macs and 680x0 Macs. Our MacBench 1.1 suite of subsystem-level benchmark tests showed that Power Macs have the raw processing potential, especially for floating-point operations, to outperform

Quadrads several times over. We also performed more than a dozen common real-life tasks, using prerelease versions of native applications on the Power Macs and shipping applications on the 680x0 Macs. Even though we used early prerelease software, the Power Macs



video is also RAM-based, smarter hardware helps provide out-of-the-box video speed better than that of any previous Mac.

Pure, Raw Speed

The single biggest promise of the PowerPC 601 chip — and of the Power Macs that use it — is an improvement in performance that's more significant than any previous step in the Mac's evolution. Indeed, how well these Macs sell will be based largely on how well they deliver on this promise, not only compared to older Macs but also compared to PCs based on Intel chips (see figure 5).

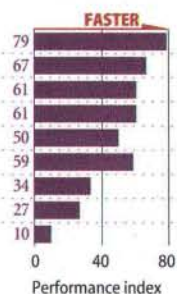
So, how fast are the Power Macs? Very fast. Usually.

The main reason the Power Macs are so fast is a PowerPC chip running at 60 megahertz in the 6100/60, 66 megahertz in the 7100/66, and 80 megahertz in the 8100/80 (caught on to the naming scheme yet?) Also, the logic boards have been designed for ultimate efficiency when moving bits of data around — and the pathway for moving those bits has doubled in width, from 32 to 64 bits (see figure 3). To squeeze out every last drop of performance, the 8100/80 includes a 256K SRAM (static RAM) cache card, which acts as a holding bin for frequently used data. The card is a \$299 option for 6100/60 and 7100/66 owners — \$299 that our tests show is money well spent.

showed their muscle. You can expect native applications running on these machines to be significantly faster by the time the applications ship. In our application-based tests, all scores are referenced to those of an LC III with an optional FPU, which are assigned a score of 10.

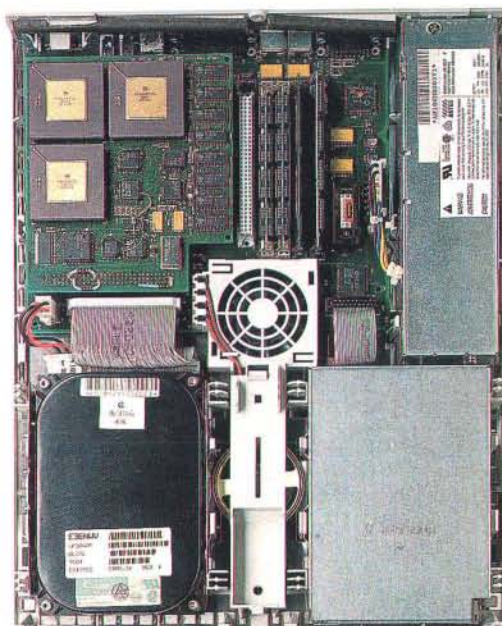
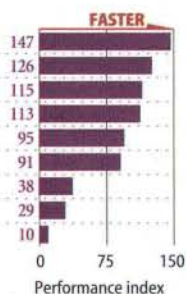
Publishing Tasks

To perform a variety of publishing tasks, we used FreeHand, PageMaker, and Photoshop.



Rendering Tasks

We used Infini-D, Painter, and VideoFusion for performing our suite of rendering tasks.



Before deciding to use the PowerPC 601, Apple built a handful of motherboards that used other RISC microprocessors — including one that used the Motorola 88100 RISC chip. This chip was used to develop an early forerunner of the 680x0 emulator now embedded in the ROMs of the Power Macs.

To find out just how fast Power Mac hardware is, we ran MacBench 1.1, our benchmark application, on each of the Power Macs. MacBench tests four basic subsystems — the processor, floating-point unit, disk, and video. (You can download a free copy of MacBench 1.1 from the MacUser Forum on ZiffNet/Mac, our on-line service. See page 4 for information on how to access ZiffNet/Mac.)

In the Processor test, the Power Macs clearly showed their muscle. Even the least powerful Power Mac, the 6100/60, ran more than twice as fast as Apple's high-end Quadra 840AV (see figure 1). The Power Macs' speed in our Floating Point test was even more impressive. For floating-point-math operations — used heavily in video-effects-processing and rendering applications, for example — the 6100/60 was more than six and a half times as fast as the Quadra 840AV. And the 8100/80 was a whopping nine and a half times as fast as the 840AV.

For video-intensive tasks, such as scrolling through graphics or drawing shapes, MacBench results showed the fastest Power Mac to be 50 percent faster than an 840AV. Disk operations showed less impressive improvements, because Apple has not yet converted its disk drivers and SCSI Manager to take full advantage of the PowerPC chip. Thus, the Power Macs' speed for disk-intensive operations was about the same as that of the Quadas.

Lightning-Fast Apps

So far, so good. But will all of your applications running on a Power Mac be two to nine times as fast as on a Quadra? That depends.

For you to see a speed increase in Microsoft Word, for example, Microsoft must convert Word to run in native mode on a Power Mac — that is, applications need to be reworked into a form that takes full advantage of the PowerPC chip.

Applications that haven't been reworked to run in native mode can work on a Power Mac, but they will run in the Power Mac's emulation mode, which is slower than native mode — much slower, in many cases. In emulation mode, software — called an *emulator* — in the Power Mac's ROM translates 680x0 instructions into the

PowerPC chip's language — applications written for 680x0 Macs think they're running on a 680x0 chip. However, just as with a human translator, things slow down in the process.

We found that updated applications running in native mode on the Power Macs were much more responsive and interactive than 680x0 versions running on 680x0 Macs. Launching applications takes a fraction of the time it does on Quadras, and opening large documents is also much quicker. Menus pop down almost instantaneously when you click on them. You spend less time waiting for dialog boxes to appear. And — artists and designers particularly will appreciate this — when you drag graphic images around on-screen, some applications let you see smooth motion of the entire image, not just an outline, in real time. Also, when you paint with a large brush in Photoshop or Painter, a Power Mac keeps up with you, even if you make long, rapid strokes.

We tested more than a dozen prerelease versions of native applications to find out if our initial enthusiasm would survive stopwatches and objective assessments. Note the word *prerelease* — these applications were still works in progress at the time of our testing and had not yet been optimized for speed. But in spite of their not-ready-for-shrink-wrap status, we found that most of the prerelease native applications acquitted themselves handsomely (see figure 1). On the low-end Power Mac, the 6100/60, prerelease native applications performing a series of business-oriented tasks ran about as fast as fully optimized 680x0 applications on a Quadra 650 — and a full two and a half times as fast as on an LC III.

For a group of publishing tasks, the overall results were better. For

example, a high-end Power Mac 8100/80 running unoptimized, prerelease native applications was more than 30 percent faster than a Quadra 840AV running applications optimized for the 680x0. The only exceptions were on tasks for which the Quadra 840AV used its DSP chip — for example, on a Photoshop Gaussian blur, the Quadra 840AV ran at the same speed as the 8100/80.

Number-crunching, rendering applications let the Power Macs really shine: The 6100/60 edged out the Quadra 840AV, and the 8100/80 was 60 percent faster than the Quadra 840AV and almost four times as fast as the Quadra 650.

The developers of the prerelease native software we used for our testing hope to increase speeds by as much as two times before they ship the products. We normally take a skeptical attitude toward this type of claim, but in this case, we think they've got a chance: Not only does the Power Macs' raw horsepower make such an increase achievable but also the developers, if they don't succeed in optimizing their applications, run a real risk of being overshadowed by competitors who do.

Old and In the Way

Although the future of native applications looks promising, 680x0 applications running under emulation on the Power Macs aren't as snappy. Your old software runs fine, but it can't keep up with native software. Depending on the task, 680x0 applications running under emulation on a Power Mac are anywhere from as fast as on an LC III to considerably faster than on a Quadra 650 (see figure 2).

There's also one caveat when it comes to the promise that your old

figure 2

A Solid Showing / applications running under emulation perform admirably

You can run your current 680x0 software on a Power Mac but not at rocket-ship speeds. Worst case, Power Macs run software written for 680x0 Macs under emulation at speeds equal to those on an LC III.

Other programs' speeds equal those on a fast 68040 Mac. Granted, you aren't buying a Power Mac to run applications at 68040 speeds, but as more applications are reworked for the PowerPC and as Apple updates

MacUser Labs



Processor

The Processor test measures raw processing power and is a good indicator of a machine's overall speed.

Floating Point

The speed of floating-point operations is important for such tasks as scientific calculation and 3-D rendering.

Video Mix

This test indicates how quickly a Mac will respond when performing such tasks as screen redraw and scrolling a graphic.

Disk Mix

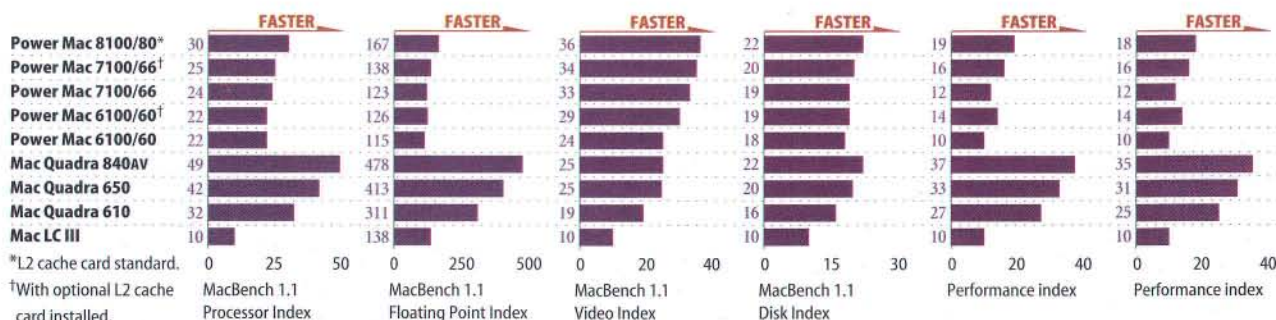
This test gauges the speed of disk-intensive operations, such as opening a large file or searching a database.

Word

Even on the 8100/80, Microsoft Word performed poorly under emulation in this search-and-replace test.

Excel

We ran a macro that recalculated a business spreadsheet multiple times. This test does not use an FPU.



Opening Up to DOS

IF YOU NEED TO LIVE IN A WINDOWS WORLD but you've always wanted a Mac, then Apple's got good news. A Power Mac with SoftWindows, Windows emulation software from Insignia Solutions, may let you have your Mac and Windows too. Just as the power of RISC enables the Power Macs to run current 680x0 Mac programs at speeds rivaling those on a Quadra 650, it also enables SoftWindows to run most DOS and Windows software at thoroughly acceptable Intel 486SX speeds. (See this month's Mac to PC for results of speed tests and a discussion of compatibility issues.)

Like Insignia's SoftPC, SoftWindows lets you use your Mac's mouse, hard disk, and display and run DOS and Windows applications just the way they run on a PC. You can cut and paste between Windows and Mac applications, and you can use your Mac's floppy and CD-ROM drives to read PC disks and CD-ROMs. You can also access PC as well as Mac networks from within SoftWindows.

You need at least 16 megabytes of RAM to run SoftWindows (that's why Apple bundles SoftWindows only with 16-megabyte Power Mac configurations). That may sound like a lot (and it is), but that memory has to support some hefty software. With 16 megabytes of RAM, a Power Mac can run the Mac operating system, the Finder, SoftWindows, DOS, Windows, a couple of business-oriented Windows applications, and a small Mac application. Having 16 megabytes of memory under Windows is a lot like having 8 megabytes with the Mac operating system. You can run standard business applications comfortably, but you need more memory to run large applications, such as those for managing databases.



The best of both worlds. Thanks to Insignia Solutions' SoftWindows software and Power Mac speed, living in both the Mac and the Windows worlds is finally practical.

Running DOS and Windows on a Mac is not new; it's just more practical on a Power Mac. For some years now, you've had the option of equipping your Mac with Orange Micro's OrangePC, a speedy 486SX coprocessor card, but at almost the cost of a PC. For just a few hundred dollars, you were able to run Insignia's SoftPC software, but you paid in very slow Windows speed. With SoftWindows installed on a Power Mac, you get the speed of lower-end 486SX hardware for the cost of a piece of software.

SoftWindows comes installed on several configurations of the Power Macs (see figure 6 for pricing and configurations). Alternatively, you can buy SoftWindows directly from Insignia Solutions (415-694-7600); pricing was unavailable at press time. / John Rizzo

more of its system software, your Power Mac will perform even faster. In our application-based tests, all scores are referenced to those of an LC III with an optional FPU, which are assigned a score of 10.

FileMaker Pro
Using FileMaker Pro, we sorted a large database. This is a common task and can be very time-consuming.

Persuasion
We drew thumbnails of a large presentation. This task relies on QuickDraw, which runs native on Power Macs.

QuarkXPress
In this global-font-change test, QuarkXPress performed at speeds close to those on high-end Quadras.



software will run under emulation on a Power Mac: Some applications — most 3-D modelers and renderers, for example — require a floating-point unit (FPU), either the FPU within a 68040 or a separate 68882 FPU coprocessor, for 68020 and 68030 Macs. Such applications first check for the presence of an FPU; if they don't find one, they politely tell you that, no, they don't feel like working today — which is what they do on a IIx or an LC III that doesn't have an optional FPU installed. Such applications can't run in emulation mode on a Power Mac, because the Power Mac's emulator mimics the operations of a 68LC040 chip — a version of the 68040 processor that lacks an FPU.

Apple engineers opted to emulate the FPU-less 68LC040 in order to reduce the complexity of the emulator — and in order to meet the Power Macs' planned release date. To be fair, applications that perform floating-point operations are prime candidates to be reworked to take advantage of the PowerPC's astoundingly fast floating-point unit — the 8100/80, for example, is more than 32 times as fast as an LC III that has an optional 68882 FPU installed when performing floating-point operations.

Despite the lack of FPU emulation, Apple's rock-solid emulator is to be applauded. MacUser Labs tested dozens of applications, control panels, and extensions, secretly suspecting that Apple's claims of near-total compatibility were a bit overblown, but we found that with a very few exceptions (most of which were server products), Apple's emulator works.

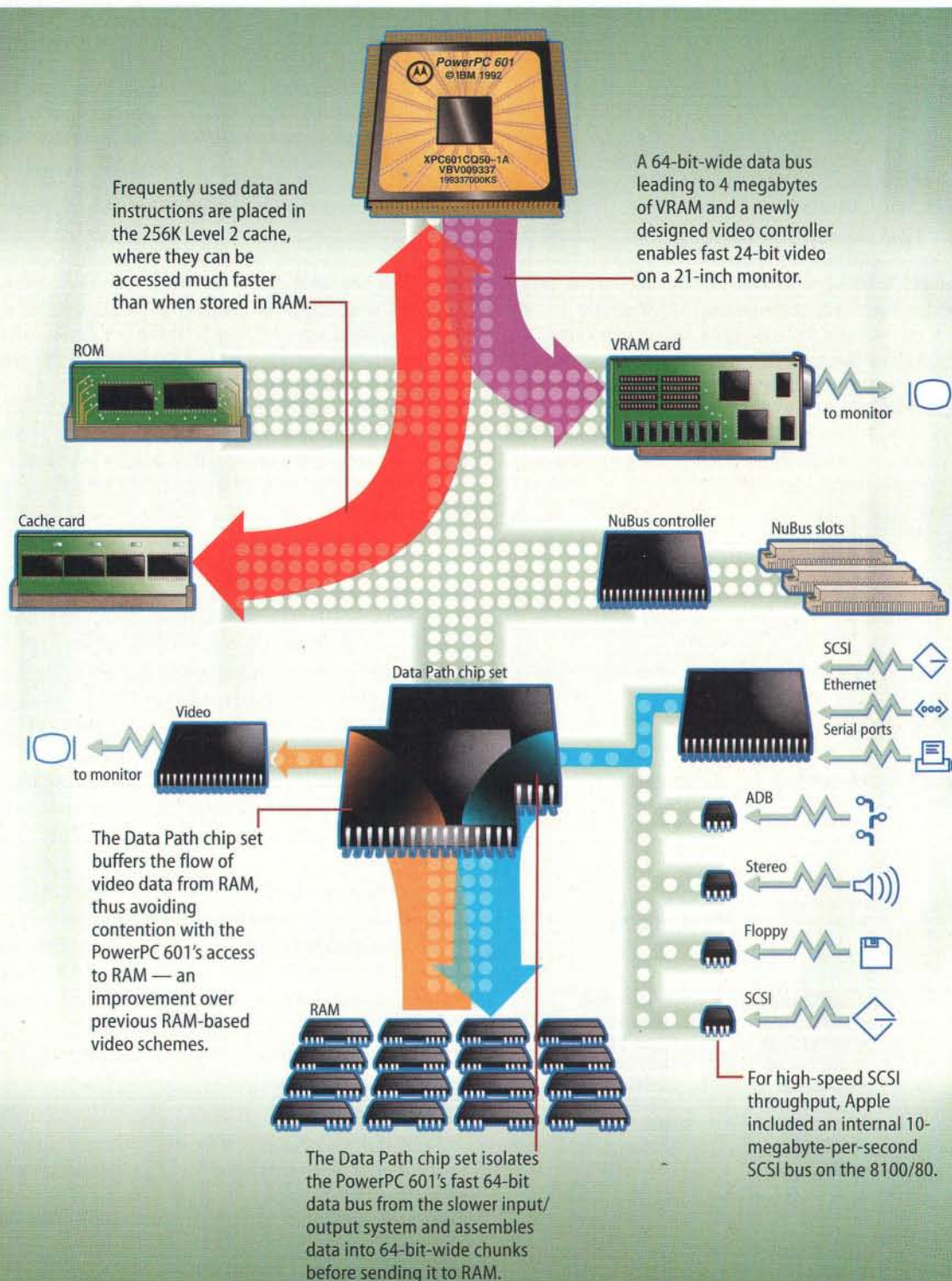
Also, Apple has made sure 680x0 applications run in emulation mode on the Power Macs at speeds that are, if not always impressive,

figure 3

Built for Speed / why the Power Macs are fast

The Power Mac 8100/80 is the fastest Mac ever — and the 6100/60 and 7100/66 aren't far behind. The key features (shown here in the full 8100/80 implementation) all contribute to the Power Macs' speed. But of the dozen new chips common to all three Power Macs, the Data Path chip set wins the best-supporting-actor award. This pair of chips takes

the load off the PowerPC 601 chip for many simple but time-consuming tasks. By using a process called DMA (direct memory access), the Data Path chip set allows fast data transfer to and from RAM, thus helping the PowerPC 601 concentrate on what it does best — crunching numbers and processing data. / Rik Myslewski



at least acceptable to most users. Much of that speed is because Apple has converted the most-performance-critical portions of the operating system to run in native mode. Because they had neither the time nor the resources to convert the whole of System 7 in one fell swoop, Apple engineers invoked the 90/10 rule (10 percent of the operating system is executed 90 percent of the time) and converted the parts that applications use most often. One example is QuickDraw, the part of the system software that handles graphics operations: Any operations that use on-screen graphics run at native PowerPC speeds — even if the applications that use QuickDraw operations are running under emulation.

Apple's marketing department is fond of mentioning that Power Macs will get faster over time (which happens to be true, so we're repeating it). They'll get faster not because you'll upgrade your Power Mac with faster hardware but because each time you install a native application in place of one written for the 680x0, you'll see a huge jump in speed. Also, as Apple converts more parts of the Mac's operating system to run in native mode, all operations that use those parts will immediately run faster.

Many vendors claim that their applications will be available in native versions within 30 days after the Power Macs first ship (see "Software: The Power and the Promise," in this issue). Others won't have native versions for several months. Microsoft Word and Excel, for example — the two most popular applications for the Mac and two of the poorest performers in our emulation tests — won't be available in native versions until this summer. If you spend a lot of time using applications that won't have native versions soon and if you are already using a powerful Centris (remember it?) or Quadra, you may find your productivity temporarily *decreasing* if you use these applications on a Power Mac.

More Than Fast

If, however, you're currently using an older Mac (or — gasp! — a PC), there are plenty of reasons to spring for a Power Mac, even if the applications you rely on haven't yet "gone native." The Power Macs pack a lot of features that can be costly to add to an older system — for example, all Power Macs come with Ethernet as well as LocalTalk ports; built-in support for 8-bit gray scale or 16-bit color on a 14-inch monitor; and two high-speed serial GeoPorts, which, with the addition of a \$130 GeoPort Telecomm adapter and its accompanying software, provides a software-based V.32bis modem with fax capabilities. You also get a full 16-bit-stereo sound system with audio quality that rivals that Bang & Olufsen rig you've had your eye on.

Apple offers the Power Macs in a variety of configurations (see figure 6). Some options include

- An AV card that supports video in a window and full-motion video-input and -output.
- Preinstalled SoftWindows software, from Insignia Solutions, that lets you run DOS and Windows programs at 486SX-processor speeds (see the "Opening Up to DOS" sidebar).
- A built-in dual-speed CD-ROM drive in a new top-loading design that eliminates the need for annoying caddies.
- Hard-disk drives with capacities from 160 megabytes to 1 gigabyte.

If you purchase a 6100/60 or 7100/66 and are more concerned about performance than budget, we recommend that you add a *level*

2 (or L2) cache card — the 8100/80 already includes Apple's 256K SRAM L2 cache card — which will dramatically boost your Power Mac's speed. In some of our tests, the 6100/60 with Apple's cache card installed outran a stock 7100/66. Third-party L2 cache cards are already being announced: Mobius plans to ship the Speedster Cache, a \$299 256K L2 cache card, soon after the release of the Power Macs. You'll also start to see slightly more expensive 512K and 1-megabyte L2 cache cards that promise even greater speed boosts.

Apple's use of a cache card to increase speed is not a new ploy. When the IIci was first introduced, its cache card was available as an option. It wasn't until much later that Apple began including the card with every IIci — and that cache card wasn't nearly as effective as the 256K SRAM L2 cache card for the Power Macs. Hopefully, Apple will include the cache card in Power Macs later down the road when costs allow it to do so without raising the price of the machines.

Making a Choice

Once you've decided to purchase a Power Mac, how do you know which one you'll need? The bad news is that making that choice is a bit harder than balancing price and performance (which can be a difficult job in itself). The good news is that if you move through your options logically, you can make a solid choice.

First, you need to figure out what type of video support you require. All three Power Macs have a monitor port to which you can attach a 12-, 13-, 14-, or 16-inch monitor. Using built-in video is inexpensive (you don't need to buy a separate card to run the monitor), efficient, and simple.

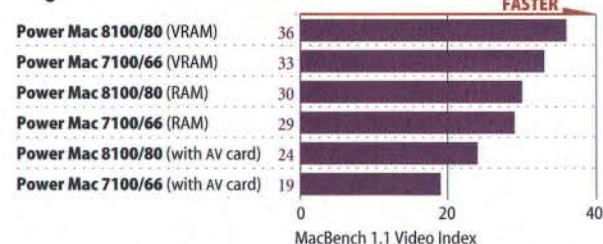
But if you opt to use this port, you should be aware of its limitations. First, an attached monitor uses 600K of your Power Mac's main memory. More important, the number of colors you can see on-screen is limited: thousands of colors on a 13- or 14-inch monitor and a mere 256 colors on a 16-inch monitor.

figure 4

Power Mac / built-in-video speed

For the best video speed, use a VRAM card. The speed of the Power Macs' built-in video varies greatly, depending on which flavor you use. In all cases, the VRAM card (available only on the 7100/66 and the 8100/80) was the fastest in our tests. The runner-up was the Power Macs' built-in RAM-based video. And watch out if you choose an AV configuration: The AV card's video speed was the slowest of the lot.

MacUser Labs



Most people in the business world can get by just fine with a 14-inch monitor that displays thousands of colors. Some of them will gladly give up a few of those thousands to have a larger screen. After all, how many colors does Excel need?

If the Power Macs' built-in video is sufficient for you, then you're a likely candidate for the lowest-cost machine, the 6100/60. If you need a larger display and more colors or if you require full-motion-video capability, then consider purchasing the 6100/60 with the AV card — at about \$300 more, it's a reasonably priced option. Like the Quadra 660AV and 840AV, the AV configuration of the 6100/60 offers NTSC, PAL, and SECAM video-in; video in a resizable window; frame and video capture; and NTSC and PAL video-out. The physical interface for video-in/out is S-video, although Apple includes an adapter for composite video.

Plus — and here's where the larger-monitor/more-colors part comes in — the AV card also contains 2 megabytes of VRAM, which gives you millions of colors on a 16-inch or smaller monitor and thousands of colors on a 19- or 21-inch monitor. The AV card installs

in the 6100/60's only expansion slot, so if you go the AV route, you can't add any other cards. But with built-in Ethernet, video capture, 16-bit sound, large-screen-monitor support, and all the other Power Mac features, you may not need to add other cards to your system, ever. Be forewarned, however: If you want an AV-configured Power Mac, you have to buy it that way — Apple doesn't plan to offer AV cards as stand-alone options. Also, the AV cards exact a video-speed penalty — their video isn't as snappy as the 6100/60's RAM video.

Your only other option for upgrading a 6100/60's video is to purchase a \$99 Power Macintosh 6100/60 NuBus adapter card. Plug it in to the 6100/60's PDS, and you have a 7-inch NuBus slot into which you can add a third-party video card.

Two on One

So, as you can see, you can run two monitors simultaneously from the 6100/60 — one from the built-in RAM video and one from an AV card or a third-party video card. The picture gets even better with the 7100/66 and the 8100/80: Straight out of the box, each can run

figure 5

The Pentium Challenge

Welcome to the face-off of the year: Power Macs versus Pentium PCs. Apple's aggressive pricing structure assures that Power Macs can compete successfully with Pentium PCs in the features-per-dollar category. Now, we're waiting to find out whether Apple's PowerPC Macs can outrun machines based on Intel's fastest chips, the Pentium and the 486DX2.

The early returns are in, and it looks like the Power Macs will win. We tested two Intel systems, one a 60-megahertz DEC DECpc XL 560 Pentium system and the other a Dell 466/MXV, which has a 486DX2/66 processor. These systems were running fully optimized, shipping applications under the Windows 3.1 operating system. On the Power

Mac side, we tested all three models plus a 6100/60 and a 7100/66 each with an L2 cache card installed. (A cache card is standard on the DECpc XL 560 and the Dell 466/MXV.) These systems were running a prerelease version of System 7.1.2 for the PowerPC and prerelease versions of native applications. All scores are referenced to those of an LC III with an optional FPU, which are assigned a score of 10.

Despite the Power Macs' handicap in running unoptimized, pre-release code, they still outran the Dell 466/MXV when performing typical business, publishing, and rendering tasks. Even better, except for the stock 6100/60, the Power Macs also outran the DEC Pentium system in most tests. / Henry Bortman

MacUser Labs



Business Tasks

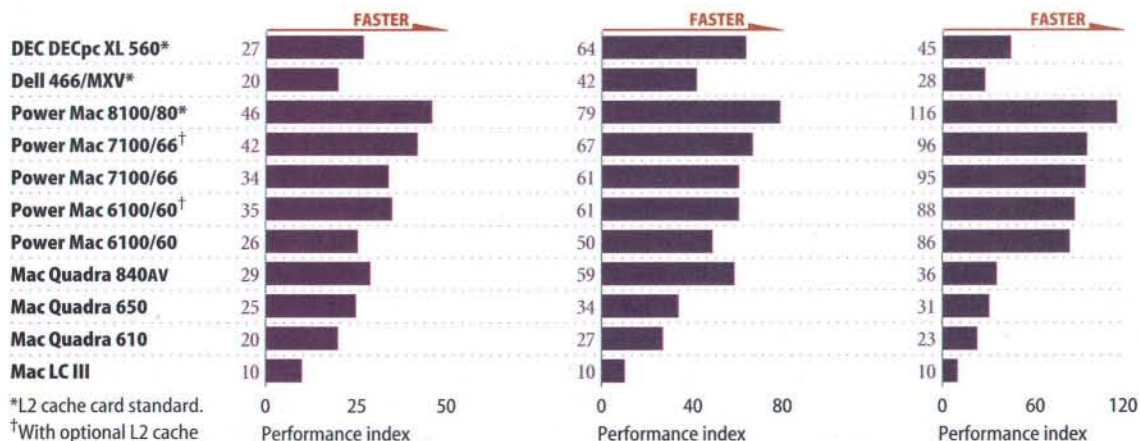
We performed a variety of standard productivity tasks, using applications such as WordPerfect and ClarisWorks.

Publishing Tasks

To perform a variety of publishing tasks, we used FreeHand, PageMaker, and Photoshop.

Painter

To test the rendering speed of the various machines, we applied lighting to an image in Painter.



two monitors. As with the 6100/60, you can drive one monitor with the machine's built-in RAM video, but in addition, the standard 7100/66 and 8100/80 each have a PDS slot that contains a high-speed VRAM card; the same slot is used in the AV configurations of the 7100/66 and the 8100/80 to house the AV card. Either the VRAM card or the AV card can drive a second monitor.

Again, however, you need to choose wisely. You can either buy your Power Mac with an AV card, which provides all the video capabilities described above, or you can get a Power Mac with a VRAM card that has 1 megabyte of VRAM standard for the 7100/66 (expandable to 2 megabytes) or 2 megabytes of VRAM standard for the 8100/80 (expandable to 4 megabytes). But you can't get a Power Mac with both an AV card and a VRAM card — the 7100/66 and 8100/80 each have only one PDS slot — and you can't change your mind after you've made your decision, because Apple is not selling the two cards separately as stand-alone options. You do have other expansion options, though: The 7100/66 and the 8100/80 each have three NuBus slots, which you can use for adding a high-performance NuBus video card. However, you'll see a speed increase only if the video card's driver software has been updated to work with the Power Macs (see "Upgrades: From Mac to Power Mac").

The 7100/66 is a bargain choice for users who don't require the ultimate in performance. If you opt for a 7100/66 with an AV card, for example, you'll have a powerful and versatile multimedia workstation. You get nearly the same video support as with the 8100/80 (the only difference is that with a fully loaded VRAM card on the 7100/66, you get thousands of colors, not millions, on a 19- or 21-inch monitor), and you also get the video-in/out features of the AV card. What you lose is the top-notch processing speed of the 8100/80 and the top-notch video-display speed provided by the VRAM card.

Choose an 8100/80 equipped with a VRAM card if you need the best-performing Mac of all time. The 8100/80 with a full 4-megabyte complement of VRAM installed can support 24-bit color on a 21-inch monitor — the most extensive built-in video support Apple has ever offered. And this video is fast! (See figure 4.) Only those users who have the most-demanding tasks will need to buy a third-party 24-bit accelerator card.

We've Seen the Future . . .

The writing is on the wall: The Power Macintosh is the future of Macintosh computing. The question is not whether you should switch to a Power Mac but when and how you should make the leap. The largest factor in your decision — aside from your budget, of course — is how soon the software you use will be available in native PowerPC form. (For a detailed list of software-conversion plans, see the "Moving On Up" sidebar in "Software: The Power and the Promise," in this issue.)

If you use mainly business applications and have an older Mac such as a IIci or aren't currently using a Mac at all, we recommend that you take the plunge. Buy a Power Mac. Even though some business applications such as Microsoft Word and Excel won't be reworked for Power Macs until later this year, you won't notice any decrease in speed if you run them under emulation on a Power Mac. But you *will* notice a dramatic speed increase when you start switching to upgraded applications.

If you work with graphics, desktop publishing, or multimedia,



THE WRITING IS ON THE WALL:

The Power Macintosh is the future of Macintosh computing. If a critical mass of native applications is released in the next few months, the Power Macs will launch Apple toward the 21st century.

you're a prime candidate for purchasing a Power Mac. These new powerhouses provide the level of performance you've been aching to have for years. First, however, find out when your necessary applications will be available in native form — for instance, multimedia publishers should note that Macromedia Director won't be available for the PowerPC until later this year. Director users might want to wait a while before buying in to the new technology.

What about Quadras, LCs, Performas, Classics, Centrises, SEs, IIs, or SE/30s? Should anyone buy one? We still think there's a market for these Macs. If you're on a tight budget, as many home users and students are, now's the time to look for good bargains on used Macs or buy a brand-new LC or Performa for about half the price of the lowest-cost Power Mac and upgrade it later. In fact, we recommend that before you buy any Mac — new or used — you check out your PowerPC-upgrade options (see "Upgrades: From Mac to Power Mac").

. . . And It Works


The Power Macs' engineering — a powerful microprocessor, a motherboard that keeps it humming, brisk video performance, and an emulator that's rock solid — is elegant and effective. The Power Macs are fast and feature-rich and are built to keep prices down and reliability high. But as solid as these new machines are, Apple is still taking a chance.

With the introduction of the Power Macintosh line, Apple breaks with its past and faces a future that is not completely of its own making. Apple is relying on developers to write native software for the PowerPC microprocessor at the heart of the Power Macs. It's relying on us to purchase Power Macs and then to buy upgraded software that takes full advantage of the power of the PowerPC 601 chip — for although the emulation software is a fine piece of

work, it's merely an interim step, a form of investment insurance.

If a critical mass of native applications is released in the next few months and if users are willing to pay for the power those applications will give them, then the Power Macs will launch Apple toward the 21st century. If not — well, that's the gamble.

We believe that it's worth the risk, that the personal-computer revolution is about giving the greatest power to the greatest number

of people at the lowest possible price. The Power Macintosh line will accelerate this revolution. 

Henry Bortman is *MacUser's* technical director. Cheryl England is a *MacUser* senior editor. Stephan Somogyi is *MacUser's* technology editor and the author of *The PowerPC Macintosh Book*, to be published soon by Addison-Wesley.

figure 6

Mix-'n'-Match Power Macs



Power Mac 6100/60



Power Mac 7100/66



Power Mac 8100/80

Sorting out your options when you purchase a Power Mac can be downright confusing. If you want a SoftWindows bundle, for instance, you get 16 megabytes of RAM but no option for a built-in CD-ROM drive. If you get an AV configuration, you automatically get a CD-ROM drive but you don't get SoftWindows bundled.

The video options are more confusing. If you use the RAM-video port, you get 16-bit color on a 14-inch monitor or 8-bit color on a 16-inch monitor. With 1 megabyte of VRAM, you get 24-bit color on a

14-inch monitor, 16-bit color on a 16-inch monitor, or 8-bit color on a 19- or 21-inch monitor. With 2 megabytes of VRAM, you get 24-bit color on a 16-inch or smaller monitor or 16-bit color on a 19- or 21-inch monitor. With 4 megabytes of VRAM, you get 24-bit color on any monitor. All video configurations support 8-bit gray scale.

Use our chart to figure out what options you can get and how much you can expect to pay. (The prices shown here reflect final Apple prices as we went to press.)

| | Installed RAM | Max. RAM expansion | Installed VRAM | Max. VRAM expansion | Hard-drive capacity | No. of NuBus slots | CD-ROM drive | SoftWindows | Price |
|---------------------------|---------------|--------------------|----------------|---------------------|---------------------|--------------------|--------------|-------------|---------|
| Power Mac 6100/60 | 8 MB | 72 MB | NA | NA | 160 MB | 0 [†] | | | \$1,819 |
| | 8 MB | 72 MB | NA | NA | 160 MB | 0 [†] | ● | | \$ |
| | 8 MB | 72 MB | NA | NA | 250 MB | 0 [†] | ● | | \$2,289 |
| | 16 MB | 72 MB | NA | NA | 250 MB | 0 [†] | | ● | \$2,519 |
| AV configuration | 8 MB | 72 MB | 2 MB | 2 MB | 250 MB | 0 | ● | | \$2,599 |
| | 16 MB | 72 MB | 2 MB | 2 MB | 250 MB | 0 | ● | | \$ |
| PowerMac 7100/66* | 8 MB | 136 MB | 1 MB | 2 MB | 250 MB | 3 | | | \$2,899 |
| | 8 MB | 136 MB | 1 MB | 2 MB | 250 MB | 3 | ● | | \$3,179 |
| | 16 MB | 136 MB | 1 MB | 2 MB | 250 MB | 3 | | ● | \$3,379 |
| AV configuration | 8 MB | 136 MB | 2 MB | 2 MB | 500 MB | 3 | ● | | \$3,989 |
| | 16 MB | 136 MB | 2 MB | 2 MB | 250 MB | 3 | ● | | \$ |
| | 16 MB | 136 MB | 2 MB | 2 MB | 500 MB | 3 | ● | | \$ |
| Power Mac 8100/80* | 8 MB | 264 MB | 2 MB | 4 MB | 250 MB | 3 | | | \$4,249 |
| | 8 MB | 264 MB | 2 MB | 4 MB | 250 MB | 3 | ● | | \$4,519 |
| | 16 MB | 264 MB | 2 MB | 4 MB | 1,000 MB | 3 | ● | | \$6,159 |
| | 16 MB | 264 MB | 2 MB | 4 MB | 500 MB | 3 | | ● | \$5,309 |
| AV configuration | 16 MB | 264 MB | 2 MB | 2 MB | 500 MB | 3 | ● | | \$5,659 |

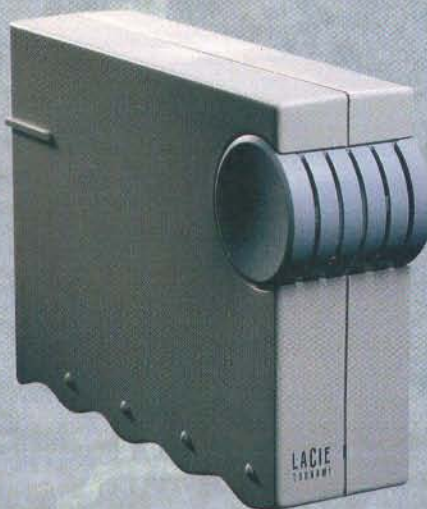
*Non-AV configurations include a VRAM card.

[†]With an optional \$99 adapter, the 6100/60 can support one 7-inch NuBus card.

[§]At press time, Apple decided not to offer this configuration.

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PocketDrives, less than 10 oz. 340MB mechanism made by Toshiba.

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"...(Silverscanner) can deliver color performance that surpasses anything else in the less-than-\$2,000 price range, including the popular ScanJet IIc from Hewlett-Packard Co." *MacWeek, May 1993*

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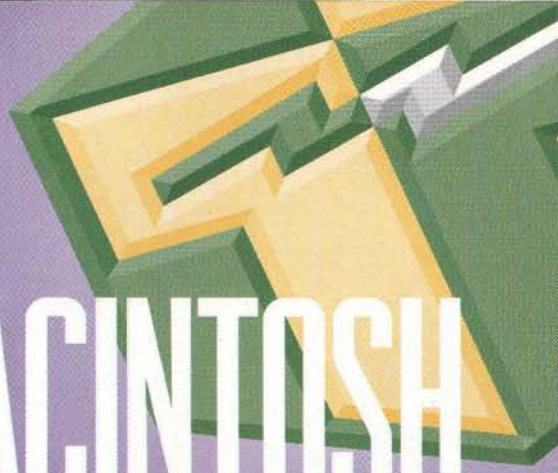
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IF YOU'VE GOT THE LUST FOR POWER

but can't afford one of Apple's new Macs, there are less expensive ways to join the PowerPC party.

Apple is aggressively encouraging current Mac owners to make the switch to PowerPC. Simultaneous with the release of the first Power Macs, Apple began shipping two types of PowerPC upgrades

MacUser Labs

— a complete logic-board upgrade and an add-on processor-upgrade card. These upgrades allow most Centris and Quadra owners to move up to PowerPC performance for significantly less than the price of a new Power Mac.

Available immediately are complete logic-board upgrades for owners of Macs based on the same designs as the Power Mac 6100/60, 7100/66, and 8100/80. These Macs include the Ilvx; Ilvi; Performa 600; Centris/Quadra 610, 650, and 660AV; and Quadra 800 and 840AV. Which Power Mac model you can upgrade to depends on which model 68040 Mac you have (see figure 2).

Upgraded machines will be functionally identical to newly purchased 6100/60, 7100/66, and 8100/80 Power Macs. You even get a new plastic case that says Power Macintosh on the outside. If you own a Centris or a Quadra, you'll be able to move your current RAM to the new logic board. Any NuBus cards, as well as storage devices or other peripherals you currently own, should also still work with your upgraded Mac (6100/60 owners will need to purchase a \$99 adapter in order to use 7-inch NuBus cards).

Apple's pricing for these logic-board upgrades makes it clear that

the company wants to move them. At press time, Apple listed final prices as \$999 for a 6100/60 logic-board upgrade, \$1,499 for a 7100/66 upgrade, and \$1,899 for an 8100/80 upgrade. That's a price/performance boost that's hard to beat. For an extra \$100 to \$400, you can get any of the logic-board upgrades in an AV configuration.

Bargain Choices

If you don't own one of the aforementioned Macs — Quadra 700, 900, and 950 owners may be particularly bitter — you still have options. Apple will offer a Power Macintosh Upgrade Card for \$699. This 68040-PDS card will work in nearly every model in the Centris and Quadra lines — exceptions include the Quadra 605, LC 475, Performa 475 and 476, and AV Macs.

Unlike Apple's logic-board upgrade, the Power Macintosh Upgrade Card doesn't replace your Mac's current logic board with a new one; instead, it adds a second processor — a PowerPC 601 chip — to your current system. The speed increase you'll see when you run native applications will depend on the type of Mac you have. The PowerPC 601 processor on the upgrade card will run at double the clock speed of the 68040 processor in the Mac you're upgrading. For example, in a Centris 610, which has a 20-megahertz 68040 processor, the PowerPC 601 on the upgrade card will run at 40 megahertz.

What does this mean to you? In our tests on prerelease versions of native software, we found that, except for floating-point operations,

By Henry Bortman

the Power Macintosh Upgrade Card made a 25-megahertz Quadra 700 run at about the same speed as a stock 60-megahertz Power Mac 6100/60 (see figure 1). A 33-megahertz Quadra 950 with the upgrade card performed on a par with a stock Power Mac 7100/66 (except in the Video Mix test). Viewed another way, the Power Macintosh Upgrade Card boosted the speed of the Quadra 700 and the Quadra 950 by about 15 to 25 percent for common business tasks, by 100 percent for publishing tasks, and by nearly 200 percent for rendering tasks.

If the Power Macintosh Upgrade Card is such a good value, why spend more for a logic-board upgrade or a new Power Mac? First, the upgrade card can't be installed in all Centris and Quadra models. Second, there are some features of the Power Macs (and the logic-board upgrades) that you don't get with the upgrade card. You don't get 16-bit stereo sound input and output or an AV option or support for two monitors. And you don't get the advantage of other performance improvements built in to Power Macs' logic boards. If you can't afford a new Power Mac or if you're not ready to fully commit to PowerPC, though, getting an upgrade card is a great solution.

But is there any room left in the market for third-party PowerPC upgrades? DayStar Digital thinks so. It will offer two PowerPro 601 68040-PDS processor-upgrade cards: one running at 66 megahertz, which is expected to list at around \$1,200, and the other running at 80 megahertz, expected to list at \$1,700.

DayStar designed the PowerPro 601 cards to deliver higher performance than Apple's Power Macintosh Upgrade Card. Unlike Apple's upgrade, the PowerPC 601 processors on DayStar's cards can run at their rated speeds, regardless of which Mac you install them in. With Apple's upgrade card installed, the 25-megahertz Quadra 700 runs at 50 megahertz and rivals the Power Mac 6100/60. But with

an 80-megahertz PowerPro 601 installed, the Quadra 700 should outperform a Quadra 700 with Apple's upgrade card installed. (PowerPro 601 cards were not available in time for testing.)

The PowerPro 601 cards have an additional advantage over the Apple upgrade card. Unlike Apple's card, a PowerPro 601 has four 72-pin SIMM slots; you can install as much as 128 megabytes of RAM directly on the card. The PowerPC processor on the PowerPro 601 should gain an additional speed boost from this arrangement, because it can access this memory faster than Apple's card can access memory on the logic board. (A PowerPro 601 can also access extra memory on the logic board.)

More to Think About

Whether you're buying a new Power Mac or upgrading an older Mac, you have some extra work to do to get maximum performance out of your system. Here are some hardware issues you need to deal with: **SCSI Device Drivers.** The ROMs in the Power Macs and in all types of PowerPC upgrades contain version 4.3 of SCSI Manager. If your hard drive's driver software does not directly support SCSI Manager 4.3, the drive will slow down. Dramatically. We tested more than 15 SCSI drivers and found that SCSI Manager 4.3-specific drivers were around 25 percent faster than non-4.3-specific ones.

How do you know if your drive has the right driver? Odds are, unless you're talking about an Apple internal drive on an AV Mac, it doesn't. If you have an older Apple drive, use the Apple HD SC Setup application (version 7.3) that comes with System 7.1.2 to update the driver on your disk. If you have a non-Apple drive, call your drive vendor and request software for updating your driver to make your drive perform optimally with SCSI Manager 4.3. If your drive vendor

figure 1

PowerPC Upgrades / can they keep up?

Not everyone can afford a Power Mac. Several upgrade alternatives can get you going at PowerPC speed. Overall, our tests show that a Quadra 700 and a Quadra 950 upgraded with Apple's \$699 Power Macintosh Upgrade Card were as fast as a Power Mac 6100/60 and 7100/66, respectively. In our application-based tests, all scores are referenced to those of an LC III with an optional FPU, which are assigned a score of 10.

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Processor

The Processor test measures raw processing power and is a good indicator of a machine's overall speed.

Floating Point

The speed of floating-point operations is important for such tasks as scientific calculation and 3-D rendering.

Video Mix

This test indicates how quickly a Mac will respond when performing such tasks as screen redraw and scrolling a graphic.

Disk Mix

This test gauges the speed of disk-intensive operations, such as opening a large file or searching a database.



*L2 cache card standard. †With optional L2 cache card installed. ‡With Power Macintosh Upgrade Card.

*Set for 8-bit video in MacBench 1.1 Video Mix test.

figure 2

Upgrade Options / for the lucky few

MacUser Labs



Finally Ilvx owners can feel vindicated. They own one of the few Macs that can currently take advantage of inexpensive upgrade options. Although only Apple and DayStar at present offer upgrades, we don't think it will be long before other vendors step in to fill the gaps.

| | Apple 6100/60 Logic Board Upgrade (\$999) | Apple 7100/66 Logic Board Upgrade (\$1,499) | Apple 8100/80 Logic Board Upgrade (\$1,999) | Apple Power Macintosh Upgrade Card (\$699) | DayStar 66-MHz PowerPro 601 (\$1,200)* |
|--------------------------|---|---|---|--|--|
| Ilvx, Ilvi, Performa 600 | | ● | | | |
| Centris/Quadra 610 | ● | | | ● | |
| Centris/Quadra 650 | | ● | | ●† | ● |
| Centris/Quadra 660AV | ● | | | | |
| Quadra 700/900 | | | | ●† | ● |
| Quadra 800 | | | ● | ●‡ | ● |
| Quadra 840AV | | | ● | | |
| Quadra 950 | | | | ●‡ | ● |

*DayStar offers an 80-MHz version of the PowerPro 601 for \$500 more.

†The PowerPC chip on the Power Macintosh Upgrade Card will run at 50 MHz on this Mac.

‡The PowerPC chip on the Power Macintosh Upgrade Card will run at 66 MHz on this Mac.

can't supply formatting software that installs a 4.3-specific driver on your hard disk, purchase third-party formatting software that can. Here are the versions to look for: La Cie's Silverlining, 5.6 or later; CharisMac's Anubis, 2.52 or later; Casa Blanca Works' Drive7, 3.0 or later; PLI's PLI Formatter, 4.1 or later; Micronet's Micronet Utility, 6.1.0 or later; and FWB's Hard Disk ToolKit, 1.5 or later.


Accelerated-Video Cards. Although Power Macs ship with built-in

video, you may want to move your current NuBus video card to the Power Mac, particularly if the card provides accelerated video. But it is *almost always a bad idea* to extract an accelerated-video card from a 680x0 Mac and plunk it into a Power Mac without upgrading the driver and, in some cases, the ROM chip on the card. If you fail to do this, your Power Mac's performance may go down the tubes.

For instance, we tested Radius' PrecisionColor Pro24X, a popular accelerated-video card, in a Quadra 840AV and in a Power Mac 8100/80. We found that an 8100/80 with the PrecisionColor Pro24X installed — without the new PowerPC-specific software — performed at only *one-seventh* the speed of the Quadra 840AV with the same card installed. With prerelease native software, however, the PrecisionColor Pro24X provided a much more respectable speed boost — the 8100/80 ran at about the same speed as the Quadra 840AV. This situation is not unique to Radius' card. E-Machines, RasterOps, and SuperMac have said that some of their cards will also need software and possibly ROM upgrades.

The moral is clear: Power Macs will give you unprecedented performance. But if you don't also upgrade the software that runs your peripherals, your new Mac won't deliver on its maximum potential.

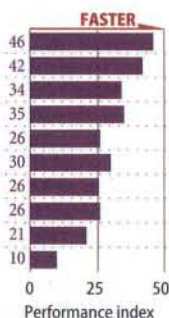
Decision Time

Perhaps your current Mac is a low-end 68040, say, a Quadra 700. You do page layout and illustrations. You want Power Mac power, but you can't afford a new machine. Your best bet may be an upgrade card. With an upgrade card, you'll be able to run native applications at top speed, but for a large job with an application that isn't yet native, you can reboot your Mac in 680x0 mode. If you own a Mac that can support a logic-board upgrade, you're in luck. For roughly half the price of a new Power Mac, you can gain the same functionality and speed. The upgrade is aggressively priced and easily puts you into the next generation of computing. 

Henry Bortman is MacUser's technical director.

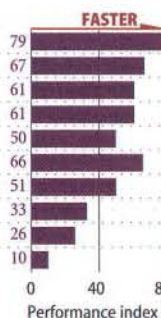
Business Tasks

We performed a variety of standard productivity tasks, using applications such as WordPerfect and ClarisWorks.



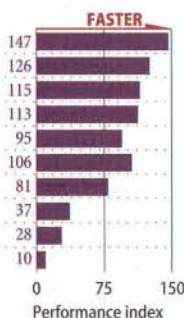
Publishing Tasks

To perform a variety of publishing tasks, such as image processing, we used FreeHand, PageMaker, and Photoshop.



Rendering Tasks

For our rendering tasks, which involved floating-point operations, we used Infini-D, Painter, and VideoFusion.





To get peak performance from your Power Mac, you'll need to upgrade your software.

SOFTWARE:

The Power and the Promise

WHEN YOU MEASURE RAW POWER, the Power Macs undoubtedly have far more than any previous Macintosh. Even the least expensive Power Mac, the 6100/60, can outperform Apple's high-end Quadra 840AV on a variety of tasks. But exactly how fast your Power Mac will run depends on the *software* you install.

The most important software on your Power Mac is System 7.1.2. System 7.1.2 differs little in appearance from System 7.1, which currently ships with 680x0 Macs. The only update to the interface that is immediately evident is a Command-M keyboard command equivalent for Make Alias. There *is* one big difference between 7.1. and 7.1.2, though — 7.1.2 runs on Power Macs. (Apple doesn't recommend that 680x0 users upgrade to 7.1.2.)

Perhaps the most significant advance in System 7.1.2 is its implementation of virtual memory. Although virtual memory was best left turned off in previous versions of System 7, we recommend that you — get this — turn it *on* in System 7.1.2. With virtual memory turned on, your applications will require less RAM. To take advantage of this feature without causing your system to slow down, we recommend that you set virtual memory to 1 megabyte more than the amount of physical RAM in your Mac.

System 7.1.2 also ships with some components that were not previously bundled with system software. For example, a new version of QuickTime, 1.6.2, is included with System 7.1.2. The most computation-intensive portions of this system extension — the codecs that compress and decompress video and sound to enable higher frame rates and larger QuickTime images on-screen — run native. The result is evident: QuickTime movies played on Power Macs don't suffer from the same jerkiness that has plagued them when they're played on slower Macs.

PlainTalk, Apple's text-to-speech and speech-recognition technology — previously available only with AV Macs — also ships with all Power Macs. Sort of. The native version of the speech-recognition portion of this system enhancement was not ready in time to ship with the first several thousand Power Macs. It will be sent to registered Power Mac owners, along with a microphone, for a nominal fee; it should be available by the time you read this.

AppleScript, Apple's scripting language, and PC Exchange, which lets Macs read DOS-formatted disks, are included as part of System 7.1.2. Previously, Apple included AppleScript only with System 7 Pro and sold PC Exchange as a separate product. Other goodies include a graphing calculator that calculates and displays the graphs of complex mathematical functions in real time as you move the graph around on-screen; the LaserWriter 8.1.1 printer driver (LaserWriter

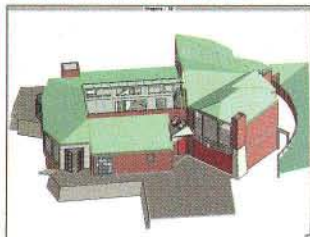
By Henry Bortman

60 seconds

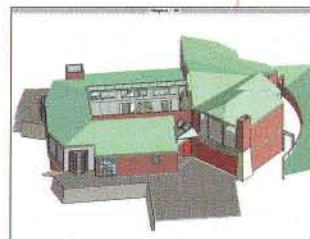
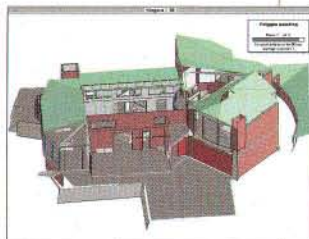
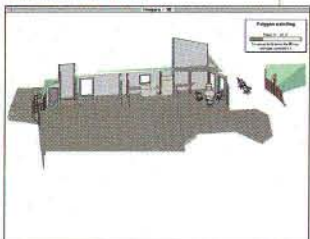
100 seconds

140 seconds

160 seconds

Power Mac 6100/60

Until you've seen a Power Mac in action, you can't fully grasp just how fast it is. To help you visualize that speed, we pitted a low-end Power Mac, a 6100/60, against a Quadra 700 on a rendering task. The image, a home designed by architect Elisabeth Vespremi, was created in ArchiCAD, an architectural modeling and rendering program from Graphisoft. The Power Mac completed the job more than twice as quickly as the Quadra — and it was running an unoptimized, prerelease version of native PowerPC software. It's this quick response to your ideas that will endear Apple's next generation of Macs to you.

Quadra 700

7.1.2 comes preinstalled); and VideoFusion's FusionRecorder, for playing QuickTime movies and (if you have an AV Power Mac model) for recording video to disk.

Making Your Power Mac Fly

But new system software will take you only part of the way toward the warp-speed experience you expect from a Power Mac. You'll also need new versions of your applications.

Applications written for Apple's 680x0 generation of Macs can run under emulation on the Power Macs. Emulation assures compatibility: You can run nearly all your current applications on Power Macs, but they'll run much more slowly than *native* applications — that is, applications converted to take advantage of the PowerPC chip. To see the speed boosts Power Macs promise, you need to "go native."

There's a fly in this ointment, however. You have to pay for all those software upgrades. How much depends on how many applications you upgrade and what the vendors charge for the upgrades. Fortunately, many vendors plan to charge only minimal shipping-and-handling fees for Power Mac upgrades. Some, however — Aldus and Quark, for example — initially plan to treat the Power Mac as a different platform from the 680x0 Mac. Aldus FreeHand, PageMaker, or Persuasion owners should prepare to pay \$100 to \$150 for a Power Mac upgrade — the same as the price for a Mac owner who wants to purchase a Windows version. QuarkXPress owners will pay \$195 to upgrade — until June, that is. Then Quark plans to sell the 680x0 and Power Mac versions as two separate products.

Hurry Up and Wait

Even if your budget can handle the cost of upgrading, you may not be able to get native versions of your applications right away — many won't be available until months after the first Power Macs ship. Microsoft Word, Microsoft Excel, and Macromedia Director are just a few of the popular applications that won't be ready until later this year. You can expect at least a 6-to-12-month transition period during which you'll use a mix of 680x0 applications running under emulation and native applications.

Some vendors are trying to make the delay as painless as possible. For example, the first native versions of Word and Excel will be full-scale upgrades (Word 6.0 and Excel 5.0): You'll get faster applications and new features all at the same time. And, although a native version of Adobe Photoshop won't be available until this summer, Adobe will initially distribute a native plug-in that gives Photoshop 2.5.1 users full Power Mac speed on the most-compute-intensive image-processing tasks. Similarly, ACI US will ship a version of 4D Compiler in March that can produce native 4D applications.

Not all vendors are sure when — or even if — they'll rework their applications. Some of these vendors have small, efficient 680x0 applications — Intuit's Quicken is an example — that run just fine on midrange Macs and thus will run acceptably under emulation. Others are waiting to get Power Macs on which to do development work.

Curiously, Apple itself appears to be as unsure as any other company about when it will come out with native applications. At press time, Apple had no comment on when At Ease, HyperCard, or Apple

Remote Access client software would be available in native versions. The only end-user product Apple is aggressively targeting for an early native release is PhotoFlash, its new image-capture and -processing application. As for Apple's server software — AppleShare 4.0, AppleSearch, and Apple Remote Access Server — the current 680x0 versions of these products can't run under emulation on Power Macs. Look for versions that will run under emulation this spring. But mum's the word on when these products will ship in native versions (see Mac to PC, in this issue).

Tricky Little Bits

Extensions and control panels can have a serious impact on a Power Mac's speed. MacUser Labs tested more than 30 popular third-party 680x0 system extensions — including Adobe Type Manager (ATM), After Dark, Now Utilities, QuickKeys, and Suitcase II — running under emulation to determine whether they would drag down the Power Macs' speed when running native applications. We found only a handful — After Dark, ATM, and Timbuktu were the worst offenders — that caused serious slowdowns.

These slowdowns are due to the way the emulator in Power Macs works. A native application that frequently calls a 680x0 extension running under emulation introduces what Apple calls *mixed-mode switches*. That is, your software causes your Power Mac to flip back and forth between using native code and 680x0 code. Every time the

system makes a mixed-mode switch, it adds a bit of counterproductive overhead. An occasional mixed-mode switch isn't noticeable. But if 680x0 system extensions are running in emulation mode and are used frequently by native software, then you may notice serious speed degradations on your Power Mac.

The biggest culprit we found was ATM. On a series of text-intensive tasks in native versions of ClarisWorks and WordPerfect, we found that ATM slowed down a Power Mac 7100/66 an average of 20 percent. And it gets worse. When we added Type Reunion and Suitcase II, two other extensions popular among desktop publishers, the slowdown on our text tests soared to 30 percent.

Less severe, but noticeable, slowdowns occurred with the popular screen saver After Dark, from Berkeley Systems. After Dark added an average of 10 percent to the time it took to complete a series of text-related tasks. Farallon's Timbuktu Pro also slowed our Power Mac 7100/66 by 10 percent. (Farallon plans to release a maintenance update of Timbuktu Pro in March that will correct the slowdowns.)

New Macs, New Jargon

As if speed issues aren't enough to worry about, you also need to learn a whole new jargon to intelligently query vendors and dealers. (This stuff is fun at cocktail parties too.) Not only have the Power Macs spawned the terms *native applications* and *emulation mode* but they've also created a need to know what a *fat application* is.

Moving On Up / the transition to native PowerPC software

YOUR FAVORITE APPLICATIONS ARE CHANGING. As you read this, programmers are busily converting the applications you use every day, tuning them to take advantage of the Power Mac's PowerPC 601 processor. We called the leading Mac-software vendors to find out when they plan to release native PowerPC versions of their applications. Some gave us exact target dates and some gave general time frames such as spring or summer — for many, "spring" means within 30 days after the first Power Macs appear. "No firm plans" means the vendor has not yet decided when it will release a Power Mac version. / Patty Ames

| Company | Application | Ship date |
|-----------------|------------------------|-----------|
| Abacus Concepts | StatView | summer |
| ACI US | 4D First | summer |
| | 4D Server | spring |
| | 4D Write/4D Calc | March |
| | 4th Dimension | summer |
| | Object Master series | March |
| Adobe | Adobe Type Manager | summer |
| | Illustrator | spring |
| | Photoshop | summer |
| | Premiere | spring |
| | Type Reunion | no plans |
| AG Group | EtherPeek/LocalPeek | March |
| Aladdin Systems | StuffIt Deluxe | spring |
| | StuffIt InstallerMaker | March |
| | StuffIt Lite | spring |
| | StuffIt SpaceSaver | spring |
| Aldus | Fetch | summer |
| | FreeHand | spring |
| | PageMaker | spring |
| | Persuasion | 1994 |

| | | |
|------------------------|------------------------------|---------------|
| Alias | Sketch! | spring |
| Apple | At Ease | no firm plans |
| | Apple Media Tool | spring |
| | Apple Remote Access | no firm plans |
| | Apple Remote Access Server | no firm plans |
| | AppleSearch server | no firm plans |
| | AppleShare server | no firm plans |
| | HyperCard | no firm plans |
| | PhotoFlash | May |
| Ashlar | Ashlar Vellum | March |
| auto-des-sys | form-Z | March |
| Berkeley Systems | After Dark | no firm plans |
| Blyth Software | Omnis 7 | no firm plans |
| Byte by Byte | Sculpt 3D/4D | March |
| CE Software | QuickKeys | no firm plans |
| | QuickMail | no firm plans |
| Central Point Software | MacTools | March |
| Claris | ClarisImpact | spring |
| | ClarisWorks | March |
| | FileMaker Pro | no firm plans |
| | MacWrite Pro | spring |
| Computer Associates | all products | no firm plans |
| Connectix | CDU | summer |
| | RAM Doubler | summer |
| CoSA | After Effects | no firm plans |
| Crosswise | Face To Face | summer |
| Dantz Development | Retrospect/Retrospect Remote | March |
| Dayna Communications | ProFiles | March |
| DeltaPoint | DeltaGraph Pro 3 | March |
| Deneba | Canvas | summer |
| DesignCAD | DesignCAD | no firm plans |
| Diehl Graphsoft | Azimuth | no firm plans |

Vendors can write their applications in one of three ways: in a version that runs on 680x0 Macs only, in a version that runs on Power Macs only, or in a version that runs on both kinds of Macs. The version that runs on both kinds is called a fat application. No matter where you run the application — on a Power Mac or on a 680x0 Mac — it will work. There's no trick to this — fat applications include the code they need in order to run on both kinds of Macs.

Don't be put off by the word *fat* — just because a fat application contains code for two types of Macs, it won't be twice as big as its nonfat counterpart. Dialog boxes, windows, and other on-screen images are responsible for much of an application's size. The application code that is specific to the 680x0 Mac and the Power Mac can share these items. The advantage of a fat application is that you can load it on a hard disk; move the drive between, say, a Quadra and a Power Mac; and run the application on either Mac.

Although the decision to purchase a fat application is mostly a question of convenience, the only extensions you should buy are the ones that are fat. Period. Extensions can be called by a variety of applications, some of which may be written for native Macs and others for 680x0 Macs. If an extension is native only and one of your 680x0 programs running in emulation mode calls it, guess what? You'll introduce mixed-mode switches and your Power Mac will slow down accordingly — and the reverse is also true.

All this *fat* talk brings us to the subject of *smart installers*. A smart

installer knows whether it's installing an application on a 680x0 Mac or a Power Mac and automatically installs the appropriate type of code. With a smart installer, one software package contains all the disks you need to load the application on your Power Mac at the office and on your 680x0 Mac at home. Ideally, developers will provide smart installers with an option to install a fat application or extension, thereby giving you the maximum flexibility. Adobe, for instance, has committed to shipping all of its applications with a smart installer that will let users select a fat option.

Most of the vendors we spoke to in early February said that they would provide a smart installer, although many couldn't tell us whether a fat installation would be an option. Over time, most developers will probably ship both 680x0 and Power Mac versions in the same box. It's too early to tell, however, whether they'll increase the price of their products in the process.

As more and more developers ship native applications and extensions, Power Macs will run faster and faster. But despite Apple's best efforts — and we have to hand it to Apple for making the transition to the Power Macs as painless as possible — it's bound to be a year in which a dose of confusion and frustration is sprinkled in with the excitement, as we learn to get the most out of our Power Macs. ☞

Henry Bortman is *MacUser's* technical director. Research assistant Patty Ames compiled our applications listing.

| | | |
|--------------------------|--------------------------------|---------------|
| Diehl Graphsoft, cont'd. | Blueprint | no firm plans |
| | MiniCAD | March |
| Electric Image | ElectricImage Animation System | summer |
| Farallon | Replica for Macintosh | no firm plans |
| | Timbuktu Pro for Macintosh | winter |
| Fractal Design | Dabbler | March |
| | Painter/Painter X2 | March |
| Frame Technology | FrameMaker | spring |
| Gold Disk | Astound | 1995 |
| Graftek | Ultimage | March |
| Graphisoft | ArchiCAD | April |
| | Atlantis | April |
| | Zoom | April |
| Great Plains Software | Dynamics | March |
| | Great Plains Accounting | no firm plans |
| Gryphon Software | Morph | May |
| Helix Technologies | Helix Express | summer |
| | Helix Tracker | early 1995 |
| HSC Software | Kai's Power Tools | spring |
| | Live Picture | no firm plans |
| | New World Explorer | spring |
| InterCon | TCP/Connect II | June |
| Intuit | Quicken | no firm plans |
| Language Engineering | LogoVista E To J | March |
| Lotus Development | Lotus cc:Mail | spring |
| | Lotus Notes | no firm plans |
| | Lotus 1-2-3 | no firm plans |
| Macromedia | Macromedia Director | winter |
| | MacroModel | March |
| Manhattan Graphics | Ready,Set,Go! | summer |
| Microsoft | Excel | July |
| | FoxPro | April |

| | | |
|------------------------|------------------------|-----------------------|
| Microsoft, cont'd. | PowerPoint | August |
| | Word | June |
| National Instruments | HiQ | March |
| | LabView | September |
| Neon Software | LANsurveyor | March |
| | NetMinder Ethernet | April |
| Nisus Software | Nisus Writer | spring |
| Now Software | Now Compress | spring |
| | Now Contact | spring |
| | Now Up-to-Date | fall |
| | Now Utilities | summer |
| Orkis | ImageBase-Pro | March |
| Pixar | MacRenderMan/Showplace | spring |
| | Typestry | no firm plans |
| Quark | QuarkXPress 3.3 | spring |
| Ray Dream | Ray Dream Designer 3.0 | spring |
| Specular International | BackBurner | no firm plans |
| | Collage | spring |
| | Infini-D | March |
| | LogoMotion | spring |
| Stac Electronics | Stacker for Macintosh | June |
| Strata | StudioPro | March |
| Symantec | all products | no firm plans |
| VideoFusion | QuickFLIX! | spring |
| | VideoFusion | March |
| VIDI | Presenter Professional | April |
| Virtus | Virtus VR | March |
| | Virtus WalkThrough | will not be converted |
| | Virtus WalkThrough Pro | spring |
| Wolfram Research | Mathematica | spring |
| WordPerfect | WordPerfect 3.0 | March |
| | WordPerfect Works | August |

INTRODUCING DIRECTOR 4.0: EASIER, AND A WHOLE LOT C

If you really want to do the cool stuff, climb aboard our newest version of the leading multimedia authoring software for the Macintosh®. Because even if you've never worked in multimedia, Director® 4.0 can help you develop the most persuasive presentations, most inspired CD-ROM titles, most entertaining kiosks, most enlightening demos, most realistic visualizations, and most anything else you have in mind.

DEVELOPERS...
START YOUR ENGINES.

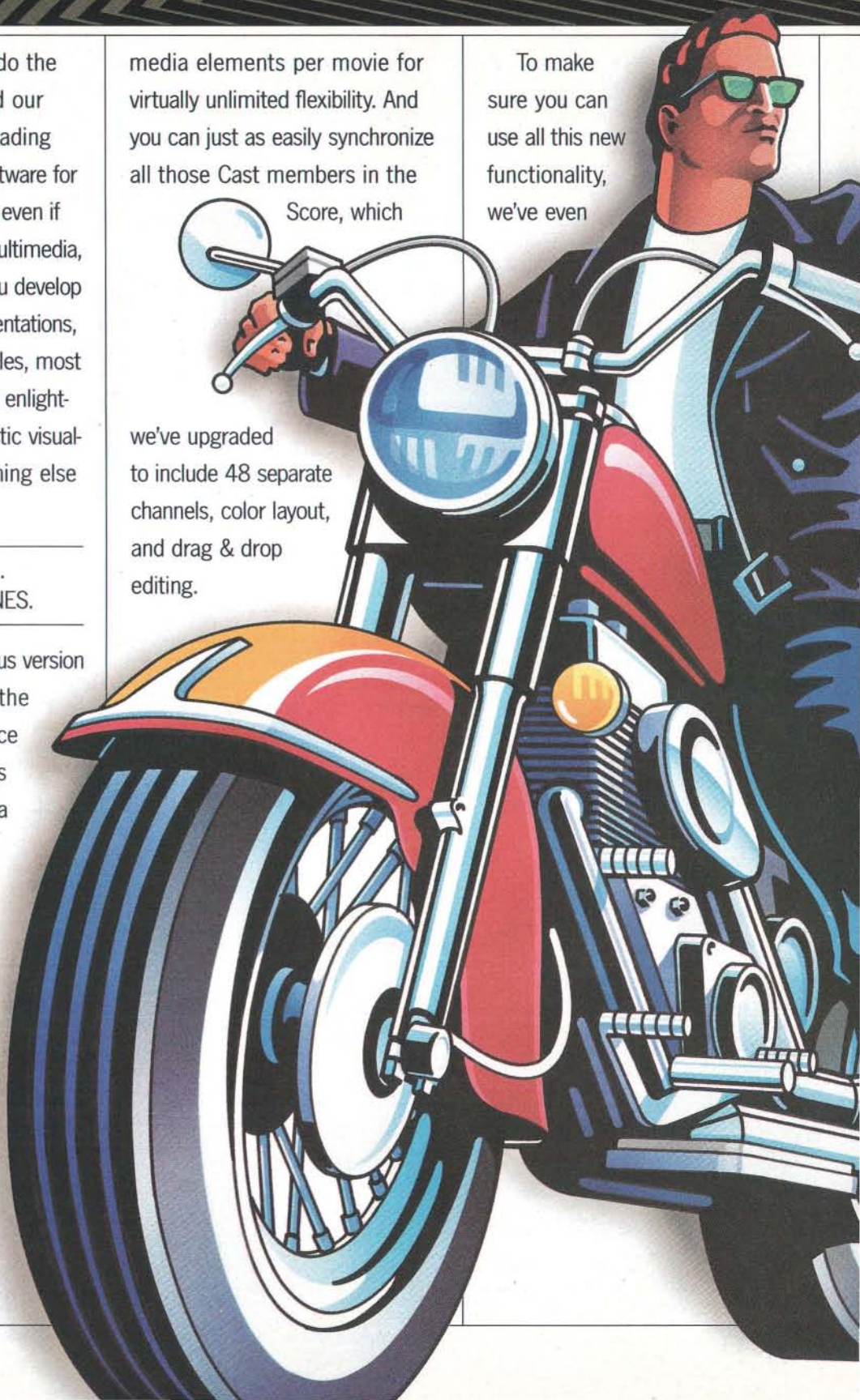
If you've used a previous version of Director®, you'll feel the extraordinary performance of version 4.0 as soon as you start it up. If you're a first-time user, our new and improved interface will enable you to cruise through the program like a pro.

For starters, we've made it easier to organize text, graphics, music, digital video, and sound effects in the Cast, our visual database that now stores up to 32,000

media elements per movie for virtually unlimited flexibility. And you can just as easily synchronize all those Cast members in the Score, which

we've upgraded to include 48 separate channels, color layout, and drag & drop editing.

To make sure you can use all this new functionality, we've even



FASTER, COOLER.

eliminated the 16MB file size limit. Now, Director files are limited only by the amount of disk space in your system.

PUT YOUR PRODUCTIONS INTO HIGH GEAR.

Not only is our newest version of Director more friendly, it's also a whole lot more powerful.

All that power starts with our Lingo™ command language, which you can use to write scripts that add interactivity, create presentation frameworks, control external devices, and build logic into your productions.

And since all Lingo scripts are compiled in Director 4.0, they'll run up to eight times faster!

Speaking of speed, we've actually made it possible for you to determine when individual cast members go in and out of RAM. This unique memory management feature, which we call Purge Priority, opti-

mizes movie playback to dramatically reduce hard disk and CD-ROM access times.

What's more, our new object-oriented Lingo commands provide reusable code and simplified scripting, enabling you to add even the most complex interactivity without all that tedious programming. You can also play and manipulate Director movies within other movies using regular Lingo commands.

MOTOR FROM MAC TO WINDOWS.

Once you complete any production, Director 4.0 ensures a seamless transition to Windows™, using our new 100% binary-compatible file format with the soon-to-be-released Director for Windows. In other words, Macromedia continues to provide the industry's one-and-only set of cross-platform solutions; from Mac to Windows—plus 3DO and other popular consumer platforms—Director productions will play on your platform of choice.

We've also added high-level security features so that the code you create can't be pirated by anyone else. And that's good

to know, since any production developed in Director 4.0 can be distributed royalty free to millions of users worldwide.

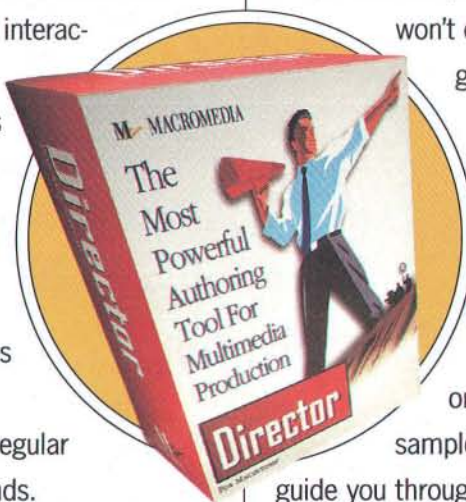
LEAN INTO THE (LEARNING) CURVE.

All these impressive features won't do you much good if you can't use them to their potential. That's why we've included new step-by-step tutorials, online help, and sample movies to guide you through the program.

With all that, it won't be long before you discover why the 200 professional developers who tested Director 4.0 found it to be the most exceptional authoring tool they had ever used.

If you're ready to see why, call **1-800-945-4058** for the name of the Macromedia Authorized Reseller nearest you (current Director users should call **1-800-457-1774** for the Version 4.0 Upgrade Kit).

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M

MACROMEDIA

TOOLS TO POWER YOUR IDEAS.

MacUser**Labs**

Choosing the Right Server

If file sharing or an old server is slowing down your office, it's time to move up to one of these fast, feature-rich alternatives.

IF YOU NEED TO BE CONVINCED you need a file server, chances are you can do without one. If, on the other hand, your workgroup or department's hunger for shared information has outgrown System 7's file sharing or if your present server just can't keep up with your growing business, the question isn't whether you should get a new server but which one you should buy.

The answer is not as straightforward as buying a new Mac and equipping it with the right software. Not all server software has to run on a Mac, even if it's running in a primarily Mac-equipped office. In addition to the familiar Apple offerings, several server-software products are available that run on PCs or PC-compatible machines.

We took a look at six server-software products that have widely disparate features, target markets, and speed. We evaluated their suitability for a mostly Mac workgroup, administrative features, ease of use, and relative speed.

Because the range of choices is so great, we split the six products we tested into two categories, based on the number of users a single server can realistically support and the features the software offers. The three workgroup-server-software products we tested are designed for groups of 60 or fewer

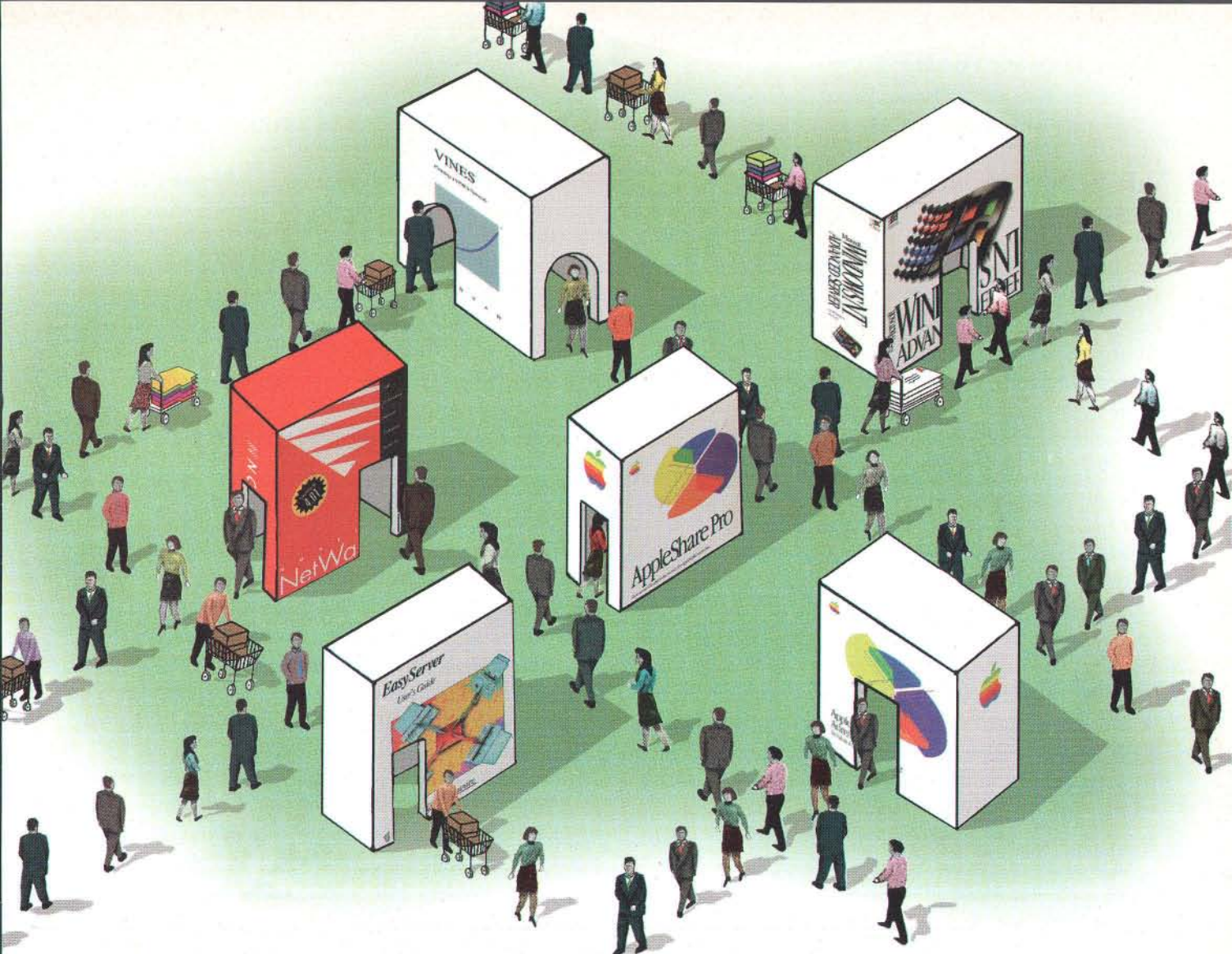
active clients who have little need for advanced security and management features. The software is available as stand-alone packages but usually comes bundled with the server hardware. The three network operating systems are complex software packages that run on a variety of powerful platforms and provide network administrators with all the security, reporting, and organizational tools needed by large, multi-platform networks.

Before evaluating the server software, consider your needs. How many users will your server need to support? Is your office all-Mac or Macs mixed with PCs? Who will administer the server? After answering these questions, proceed to pick a server that's within your budget and that will grow with your company.

Workgroup-Server Software

If you're planning to add a file server to your office network, it's probably because of growth. File sharing's no longer adequate, your storage needs have expanded, and you may be concerned about data management and security.

For our workgroup-server tests, we looked at AppleShare 4.0 software running on a Quadra 800. Apple sells this bundle



as the Apple Workgroup Server (AWS) 80. We also looked at EasyServer software, from COPS (CoOperative Printing Solutions), running on a Cobra 486DX/66 with a SCSI card that supports storage devices formatted for Macs. (COPS sells the software bundled with other PC clones too.) Finally, we revisited AppleShare Pro 1.0 running on a Quadra 950 with a PDS card that includes a second-level memory cache and a DMA (direct memory access) SCSI port, available in a bundle as the Apple Workgroup Server 95 (see review, December '93, page 73). AppleShare Pro is a version of AppleShare that runs on top of A/UX, Apple's UNIX operating system. A/UX makes it possible to tune the server for increased speed by adjusting memory and file caches.

Setting up any of these three servers is a breeze — you simply plug them in. The AWS 80 and the AWS 95 come with AppleShare installed. Even though the EasyServer server is a PC clone, getting the server up and running is as easy as attaching a Macintosh-formatted hard-disk drive to the SCSI-card port and inserting the EasyServer floppy disk into it.

The EasyServer server is managed from a Mac on the network, where the administration software is installed — no monitor or

keyboard is required for the PC that's running EasyServer. With the AWS 80 and the AWS 95, on the other hand, AppleShare features must be managed from the server — unless you have an administration tool such as TechWorks' Server Manager or Sonic Systems' Server Sentry, which can be used on a client Macintosh.

Like AppleShare 3.0 before them, AppleShare 4.0 and AppleShare Pro include print-server software, allowing users to spool their print jobs to the server, thus freeing up the client machines. EasyServer provides no print services.

Each product has straightforward administration tools for creating users and groups and assigning passwords. AppleShare uses two-way encryption of passwords. When you type a user password, it is scrambled, so it can't be captured by network-monitoring systems. AppleShare's administrator security allows you to limit the number of failed log-ins and specify a minimum password length. EasyServer sends passwords without encryption and does not have any password-administration features.

By Julie Baher and Shelly Brisbin

Each package lets administrators set various folder-access rights, much as System 7's file sharing does. Users can set rights for the folders they control.

Workgroup-Server Speed. The more simultaneous requests a server can handle without grinding to a halt, the better. We attached each server over Ethernet to a network of 80 Mac clients and tested it with 0, 10, 20, 40, 60, and 80 clients providing background traffic. We copied a file and a folder from another client to the server and from the server to the client and then opened a file on the server and saved it back to the client (see figure 1). We measured both the response time and *scalability*, how well the server responded to the increasing workload.

We found minimal differences among the AWS 80, the AWS 95, and the EasyServer server in *read speed* — that is, the speed of copying files and folders from the server. However, both the AWS 80 and the AWS 95 outperformed the EasyServer server in *write speed* — copying files and folders to the server. The AWS 80 was as much as 40 percent slower than the AWS 95 on the write tests but was more than 10 percent faster when reading.

We also tested a beta version of Apple's upgrade to the AWS 95 software, which includes improvements to A/UX and AppleShare Pro. We noted a whopping 240-percent increase in read speed and a 30-percent boost in write speed. For those who purchased an AWS 95 before December 1993, the upgrade, available now, is \$199; for more-recent buyers, it's free.

According to Apple, the AWS 95 can support as many as 50 active users, but we found that it held up even under much heavier loads. The AWS 80 is intended for no more than 30

active clients; our testing brought it to its knees at 40.

Where Apple was modest, COPS was a mite optimistic. COPS sells its product with a variety of hardware platforms based on Intel chips and claims that it supports an unlimited number of users. We tested it with COPS' Cobra 486DX/66 PC, with 32 megabytes of RAM and a 1-gigabyte Seagate hard drive — a robust system. The EasyServer server completed some of the tests when accessed by 80 users, but in most cases, it ground to a halt with 60 users. Of course, the number of active users a file server can support depends greatly on the amount of data being transferred and, in the case of EasyServer, on the hardware configuration you choose.

Network Operating Systems

Sluggish speed, heightened security concerns, and the need to connect your site to larger networks are all signs that your workgroup server may no longer meet your requirements. You could choose to solve the speed problem merely by adding more servers to the network, but administration would become a headache. A *network operating system* (NOS) designed for a large local-area network (LAN) or enterprisewide network can solve your problem — unfortunately, no current NOS runs on a Mac.

NOS products can support a few dozen users or a few hundred. They lack the familiar interface of Apple software, but they offer more and better features, such as built-in routing, cross-platform and multiprotocol support, robust security, and greater speed.

We evaluated three PC-based NOS server-software packages — Banyan's VINES 5.52, Microsoft Windows NT Advanced Server 1.0, and Novell's NetWare 4.01 — focusing on their support for Mac networks and users, their feature sets, and their speed. Although each provides a rich environment for DOS and Windows clients, they have often treated Mac users as second-class citizens, giving them less access to the advanced features PC users take for granted. Fortunately, that's beginning to change.

OS D tente. The most intriguing product we evaluated was Windows NT Advanced Server — a merger of Microsoft's Windows NT operating system and LAN Manager server software. It is the only NOS we reviewed that includes AppleTalk support at no extra cost. With solid, clear documentation and an icon-based interface, Windows NT Advanced Server is quick to set up. By offering a complete range of services to PC and Mac clients in this product, Microsoft has set a new standard for Mac integration into NOS environments.

NetWare 4.0 is Novell's long-awaited successor to NetWare 3.x. NetWare 4.01, the version we tested, includes a free 5-user license pack of NetWare for Macintosh 4.01 to whet your appetite. To get Mac support for all of your users, you need to buy NetWare for Macintosh. The complete Mac package provides support for 1,000 users (up from NetWare 3.x's limit of 200

The Bottom Line

FILE-SERVER SOFTWARE VARIES WIDELY in capability and speed and is designed for networks of different sizes. For small workgroups, no one product merits our full recommendation. Among network operating systems, however, a clear winner emerges, based on price/performance, customer service, Mac-specific features, and ease of use.

⊕ = OUTSTANDING

● = ACCEPTABLE

⊖ = POOR



NetWare 4.01

The undisputed speed champ, Novell's NetWare (\$9,990 list, \$7,570 street) is also the most mature network operating system we tested. It's complex but loaded with advanced features.



AppleShare 4.0



Microsoft Windows NT Advanced Server 1.0



AppleShare Pro 1.0



EasyServer 1.0



VINES 5.52

PRICE/
PERFORMANCE

CUSTOMER
SERVICE

FEATURES

EASE OF
USE



Listing is alphabetical within groups of equal mouse ratings.

figure 1

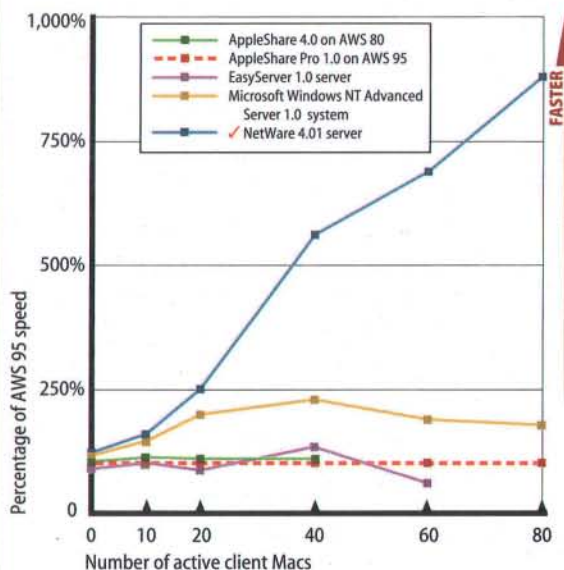
Speed Tests / finding the servers' limits

MacUser Labs

Some servers are stronger than others — they manage simultaneous requests from more clients and do so faster. We connected each of our six file servers over Ethernet to a network of 80 Mac clients, which generated background traffic while we did our tests, and began testing with no clients (no background traffic). Then we increased the client load to 10,

20, 40, 60, and 80 Macs. The speeds shown are relative to the AWS 95's.

The differences in server speed were apparent even with 10 and 20 active clients — and became extreme with higher loads. The AWS 80 and the EasyServer server failed at 40 and 60 active clients, respectively. Despite the best efforts of Banyan technicians, the VINES server consistently crashed at a mere 10 active clients.

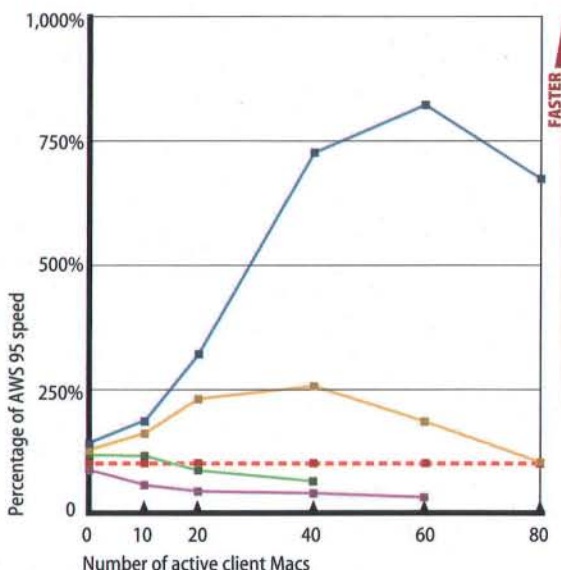


MacUser RECOMMENDS

Note: The VINES 5.52 server failed to complete any of our speed tests.

Reading Files from the Server

To test the servers' read speed, we copied a 5-megabyte file and a 5-megabyte folder from the server to a Mac client. We also opened an Excel spreadsheet on the server from the Mac client.



Writing Files to the Server

To test write speed, we reversed the procedure, copying the same file and folder from the client back to the server. We also saved the Excel spreadsheet from the client to the server.

users). Several included NLMs (NetWare Loadable Modules) control AppleTalk services, and you need to work with several of them to get your server ready for Mac clients.

Like NetWare, Banyan's VINES supports Mac clients through an add-on product — in this case, VINES Option for Macintosh, which provides AppleTalk services.

It is possible to install and maintain NetWare and VINES server software yourself by studying the voluminous documentation. However, many organizations choose to send their network administrators to training courses to become certified system administrators. Windows NT Advanced Server, on the other hand, requires no special training — although a knowledge of Microsoft Windows is helpful.

All three of these products are easy to install, if not to configure. Windows NT Advanced Server is the simplest, partly because Mac support is integrated. NetWare and VINES require some tinkering to get AppleTalk up and running. If you intend to use the products' network routing capability, for example, plan on a more complex installation/configuration process.

We found Windows NT Advanced Server intuitive, logically

Improving on AppleShare

STRAIGHT OUT OF THE BOX, AppleShare may not contain all the bells and whistles of a sophisticated NOS (network operating system), but Apple offers options for AppleTalk networks that take up some of the slack.

Users of System 7 Pro (\$149) can log on to many AppleShare servers simultaneously, using the PowerTalk Key Chain, a global-log-in ability that also extends to the mail- and catalog-server software in the PowerShare Collaboration Servers package (\$999).

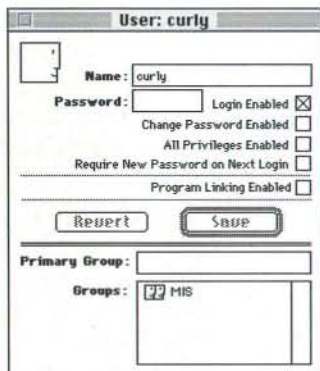
The catalog-server software gives your network sophisticated directory services that can be automatically distributed over several servers. Third-party gateways connect PowerShare to PC- and UNIX-based directory and mail systems. PowerShare also adds security to an AppleTalk network by authenticating users and encrypting data.

PC-based NOS products provide dial-in server connections for their PC clients, but none support Macs. Macs can reach an AppleShare server remotely through an Apple Remote Access Multiport Server (\$1,799 for four ports), which includes NOS-like multilevel security and can handle as many as 16 modems.

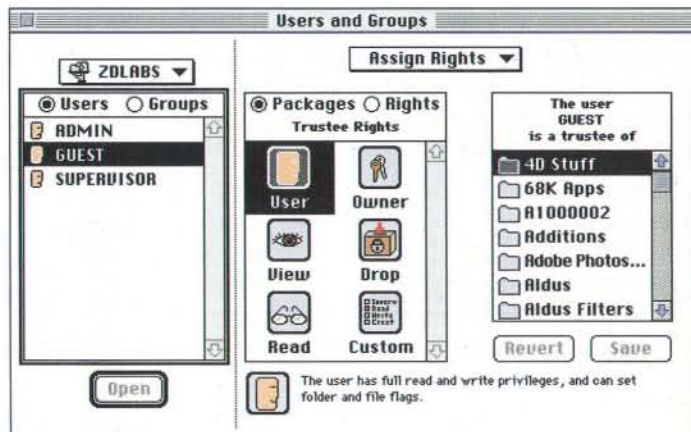
/ John Rizzo

figure 2

Mac Management / Apple has the advantage



AppleShare administration features include configuration of user and group access as well as definition of password restrictions. All management occurs on the server machine. The interface is the same in AppleShare Pro and AppleShare 4.0.



The Mac utility for NetWare 4.01 boasts an improved interface but does not replace the PC-based administrator software you need in order to create users and groups. You can assign server-access rights from the Mac utility, however.

designed, and the simplest to manage of the three NOS products. Functions such as setting file permissions and printing are integrated into the standard Windows print and file managers. To simplify administration, almost all Mac-client functions are handled identically to those for PC clients. All server administration can be done from the server machine or from a PC running Windows NT — you can't manage the server from a Mac, unfortunately.

Management of a NetWare server takes place at both the server and the administrator's client PC. You can invoke AppleTalk printing, server configuration, and routing, among other things, from the server. All user and file administration takes place on a DOS or Windows client. Using NetWare's Mac-client utilities, you can perform some administrative tasks — the management of print queues, users, groups, access rights, and messaging — from a Mac. The Mac utilities, although improved greatly over NetWare 3.11's NetWare DA, are still a poor substitute for the PC administration software.

VINES is configured from the server and a client PC. You can set file access, but little else, from a Mac.

Easier and More Powerful. One powerful feature of NOS products is *global log-in*, the ability to allow administrators to grant users access rights to services and directories on all networked servers rather than having to create accounts and privileges for each individual server. Users also gain the convenience of logging in just once for all the services they use — a user does not have to know the physical location of the network's servers. Apple's AOC (Apple Open Collaboration Environment) offerings, PowerTalk and PowerShare, have begun to offer these and other global capabilities to all-Mac environments (see the "Improving on AppleShare" sidebar).

Each of the NOS products offers global log-in for DOS and

Windows clients. However, although an administrator can set global access rights for Mac clients, Mac users must still log in to each server individually. Novell promises that its next version of NetWare for Macintosh will provide global-log-in support.



AppleShare 4.0

Rating: ★★☆☆

Price: \$1,899 list/\$1,600 street; AWS 80 bundle (Quadra 800, 16 megabytes of RAM, 1-gigabyte hard drive, DDS-DC tape drive, AppleShare 4.0), \$7,009 list/\$6,685 street.

Pros: Easy to install and use.

Cons: Slow. Limited administration options.

Max. no. of clients: 150 per server.

Max. no. of active users: 30 per server.

Hardware supported: 68040-based Mac (except A/UX).

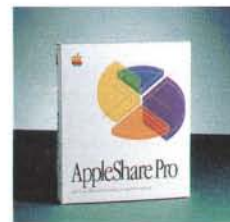
Server OS: System 7.1.

Client OS: System 6.0.4 or later.

Protocols: AppleTalk, TCP/IP.

Topologies: Ethernet, FDDI, LocalTalk, token ring.

Company: Apple Computer, Inc., Cupertino, CA; 800-776-2333 or 408-996-1010.



AppleShare Pro 1.0

Rating: ★★☆☆

Price: \$2,279 list/\$1,815 street (includes AppleShare Pro software, A/UX, and PDS card with 128K cache); AWS 95 bundle (Quadra 950, 32 megabytes of RAM, 1-gigabyte hard drive, PDS card with 512K cache, DDS-DC tape drive, A/UX, AppleShare Pro), \$10,349 list/\$9,800 street.

Pros: Easy to install and use. Print-server software included. Upgrade shipping at press time should improve speed.

Cons: Expensive. A/UX is quirky.

Limited administration options.

Max. no. of clients: 200 per server.

Max. no. of active users: 50 per server.

Hardware supported: Quadra 900 or 950.

Server OS: A/UX 3.0.1.

Client OS: System 6.0.4 or later.

Protocols: AppleTalk, TCP/IP.

Topologies: Ethernet, LocalTalk.

Company: Apple Computer, Inc., Cupertino, CA; 800-776-2333 or 408-996-1010.

Access to global-directory services is among the great advantages of a true NOS. Global directories are databases of users and services that can be shared among different types of servers. Users can share access to remote servers and can locate others in the global directory.

VINES' StreetTalk directory services are complete and well connected (through gateways and standard protocols such as X.400) to other directory platforms. NetWare 4.0 marked the launch of NDS (NetWare Directory Services). Novell has not yet made global services available to Mac users of NetWare, although it plans to have NDS support for the Mac later this year. Windows NT Advanced Server has no global-directory services. Microsoft plans to implement them in its Enterprise Messaging System, but no release date has been announced.

Printing and Security. We connected an Apple LaserWriter IIg (with built-in Ethernet) to a server running Windows NT Advanced Server and one running NetWare. VINES required an additional package (VINES PC Print, \$495) to support network printing. This seems odd, because most printers are networked. We requested a copy of VINES PC Print for testing, but Banyan declined to provide it.

Windows NT Advanced Server has a built-in Microsoft TrueImage PostScript-clone RIP (raster-image processor), which allows Mac users to print to non-PostScript printers

such as the popular Hewlett-Packard LaserJet II. This is a great advantage for offices that have non-PostScript printers.

NetWare for Macintosh supports non-Mac clients printing to AppleTalk printers. The software also has new PPD (PostScript Printer Description) files that support PostScript Level 2 and the new PostScript Level 2 drivers.

The PC world has always been more security-conscious than the Mac community — but we'll resist the temptation to revive fading stereotypes. Windows NT Advanced Server and NetWare each include User Authentication Method (UAM) utilities, which allow Mac clients to use password encryption and extended password lengths. Mac clients log in to a VINES server through Banyan's VINES system extension or through the Chooser.

NOS administrators can choose from a variety of client-access restrictions, including log-in times, log-in durations, and the available disk space per client. They can also set expiration dates for user accounts and passwords. NetWare has the most options of this kind, and each of the three NOS products offers more options than AppleShare does.

In addition, each one lets administrators set access rights to individual files. AppleShare supports only folder-level rights. With VINES and NetWare client utilities, Mac users can set access rights to the files and folders they control.



EasyServer 1.0

Rating: ★★

Price: \$1,000 list/\$1,000 street; bundle as tested (Cobra 486DX/66, 32 megabytes of RAM, Ethernet and SCSI cards, software), \$5,600 list/\$5,150 street; Ethernet and SCSI cards, software, \$1,400 list/\$1,300 street.

Pros: Inexpensive if existing hardware is used.

Cons: No print services. Mediocre speed.

Max. no. of clients: Unlimited.

Max. no. of active users: 100 per server.

Hardware supported: 286 or later PC or compatible.

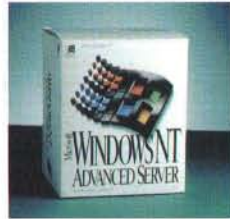
Server OS: DOS 3.3 or later.

Client OS: System 6.0.4 or later.

Protocols: AppleTalk.

Topologies: Ethernet, LocalTalk.

Company: CoOperative Printing Solutions, Inc., Norcross, GA; 404-840-0810; 404-448-7821 (fax).



Microsoft Windows NT Advanced Server 1.0

Rating: ★★

Price: \$2,995 list/\$970 street (unlimited users).

Pros: Easy to install and use. Excellent price/performance ratio. Integrated Mac services.

Cons: Average speed. No global-directory services.

Max. no. of clients: Unlimited.

Max. no. of active users: Depends on hardware.

Hardware supported: 286 or later PC or compatible; DEC Alpha, Intergraph Clipper, or SPARC workstation.

Server OS: Windows NT Advanced Server.

Client OS: MS-DOS, OS/2, System 6.0.4 or later, Windows, Windows for Workgroups, Windows NT.

Protocols: AppleTalk, DLC, IPX, NetBEUI, TCP/IP.

Topologies: Ethernet, LocalTalk, token ring.

Company: Microsoft, Redmond, WA; 800-426-9400 or 206-882-8080; 206-936-7329 (fax).



NetWare 4.01

Rating: ★★

Price: \$8,795 list/\$6,665 street (100 users); NetWare for Macintosh 4.01, \$1,195 list/\$905 street (1,000 users).

Pros: Very fast. Feature-rich. Mature technology.

Cons: Expensive. Complex administration. Mac access to directory services incomplete.

Max. no. of clients: 1,000 per server.

Max. no. of active users: Depends on hardware.

Hardware supported: 386 or later PC or compatible.

Server OS: NetWare 4.01.

Client OS: DOS, OS/2, System 6.0.4, UNIX, Windows.

Protocols: AppleTalk, IPX/SPX, LAT, OSI, SNA, TCP/IP.

Topologies: ARCnet, Ethernet, FDDI, LocalTalk, token ring.

Company: Novell, Provo, UT; 800-453-1267 or 801-429-7000.



VINES 5.52

Rating: ★

Price: With VINES Option for Macintosh, \$11,990 list/\$10,790 street (100-user license); VINES Option for Macintosh, \$1,995 list/\$1,795 street; VINES PC Print, \$495 list/\$450 street.

Pros: Global-directory services.

Cons: Failed speed tests. Network-printer support costs extra. Outdated interface.

Max. no. of clients: 250 per server.

Max. no. of active users: 250 per server.

Hardware supported: 386 or 486 PC or compatible.

Server OS: UNIX.

Client OS: DOS, OS/2, System 6.0.4 or later,* Windows, Windows for Workgroups.

Protocols: AppleTalk,* IPX, NetBIOS, TCP/IP, VINES IP.

Topologies: Ethernet, LocalTalk,* token ring.

Company: Banyan Systems, Inc., Westboro, MA; 508-898-1000; 508-898-1755 (fax).

*With VINES Option for Macintosh.

NOS-Server Speed. To evaluate the three NOS products fairly, we loaded them on typically hefty PC server hardware: a Compaq System Pro XL 486DX/50 with 32 megabytes of RAM and a Seagate 1-gigabyte hard drive. We divided our Ethernet network of 80 client Macs into four segments to minimize network-based bottlenecks.

The NetWare server showed remarkable speed and scalability. Its read speed was nearly 700 to 900 percent that of the AWS 95 when dealing with requests from 60 to 80 active clients. It also easily outpaced the server running Windows NT Advanced Server, which began to slow at loads greater than 40 users. However, the latter was as much as 150 percent faster than the AWS 95 for reads and writes with varying client loads. Microsoft has announced an upgrade, scheduled for release during the second quarter of 1994, that it claims will boost a server's speed on AppleTalk networks.

On the other hand, the VINES server was a complete bust. We were unable to use VINES on a segmented network, and on an unsegmented network, the software consistently crashed when copying files to and from the server, even at a 20-user load. Despite their best efforts, Banyan representatives were unable to diagnose and fix the problems within the time frame available for our tests — eight weeks.

Hard Choices

Although AppleShare 4.0 and AppleShare Pro are easy to use and offer the familiarity of the Mac interface, neither they nor EasyServer earned our endorsement. If you must pick server software for a workgroup, one of the AppleShare packages is your best bet, depending on the number of Mac clients. Keep


PowerPC / faster servers

POWERPC-BASED APPLE SERVERS that have AppleShare running in emulation mode are scheduled to appear later this year — today's AppleShare won't run in emulation on the new Power Macintosh computers. A native version of AppleShare is slated to appear after that — and the speed improvement promises to be well worth the wait.

Other vendors are jumping on the PowerPC bandwagon. Novell has announced that it will port NetWare to Apple's Power Macs, and Microsoft's Windows NT Advanced Server will run on IBM's PowerPC Reference Platform, which is scheduled to be released this summer.
/ Shelly Brisbin

in mind, though, that AppleShare lacks the administration features of a NOS.

If you do settle for AppleShare, investigate adding Apple's PowerShare (\$999). It lets you add directory services and — if you have System 7 Pro installed on Mac clients — global login, features otherwise available only with NOS products.

Windows NT Advanced Server integrates Mac support and simplicity of management, but server speed was somewhat disappointing when compared to that of a NetWare server. Despite its complexity and cost, NetWare has a proven track record and is the clear choice for medium-sized and large organizations. It's scalable; feature-rich; and very, very fast. 

Julie Baher is a San Francisco-based writer and consultant. Shelly Brisbin is a *MacUser* associate editor. ZD Labs' Lori Mitchell and Alan Chan managed the testing for this report.

figure 3

Features of File-Server Software / sizing them up

Matching server software to your needs means asking and answering questions. You'll need to pick a product that is compatible with your

network and that has the features you're looking for. Advanced printing features are important if you plan to use a print server.

| | AppleShare 4.0 | AppleShare Pro 1.0 | EasyServer 1.0 | Microsoft Windows NT Advanced Server 1.0 | ✓ NetWare 4.01 | VINES 5.52 |
|----------------------------|-------------------|-----------------------|-------------------|--|-------------------|---------------|
| DOS/Mac filename mapping | ● | ● | | ● | ● | ● |
| Global directory services | | | | | ●* | ● |
| PostScript Level 2 support | | | | ● | ● | ● |
| Print-server software | ● | ● | | ● | ● | † |
| Backup software | § | § | | ● | ● | ● |
| Routing software | | | | ● | ● | ● |
| File passwords | | | | ● | ● | ● |
| Printer passwords | | | | ● | ● | ● |
| Password encryption | ● | ● | | ● | ● | ● |

✓ MacUser RECOMMENDS

*Not yet available in NetWare for Macintosh.

†VINES PC Print print-server software is available as an option.

§Retrospect Remote backup software is available as an option.

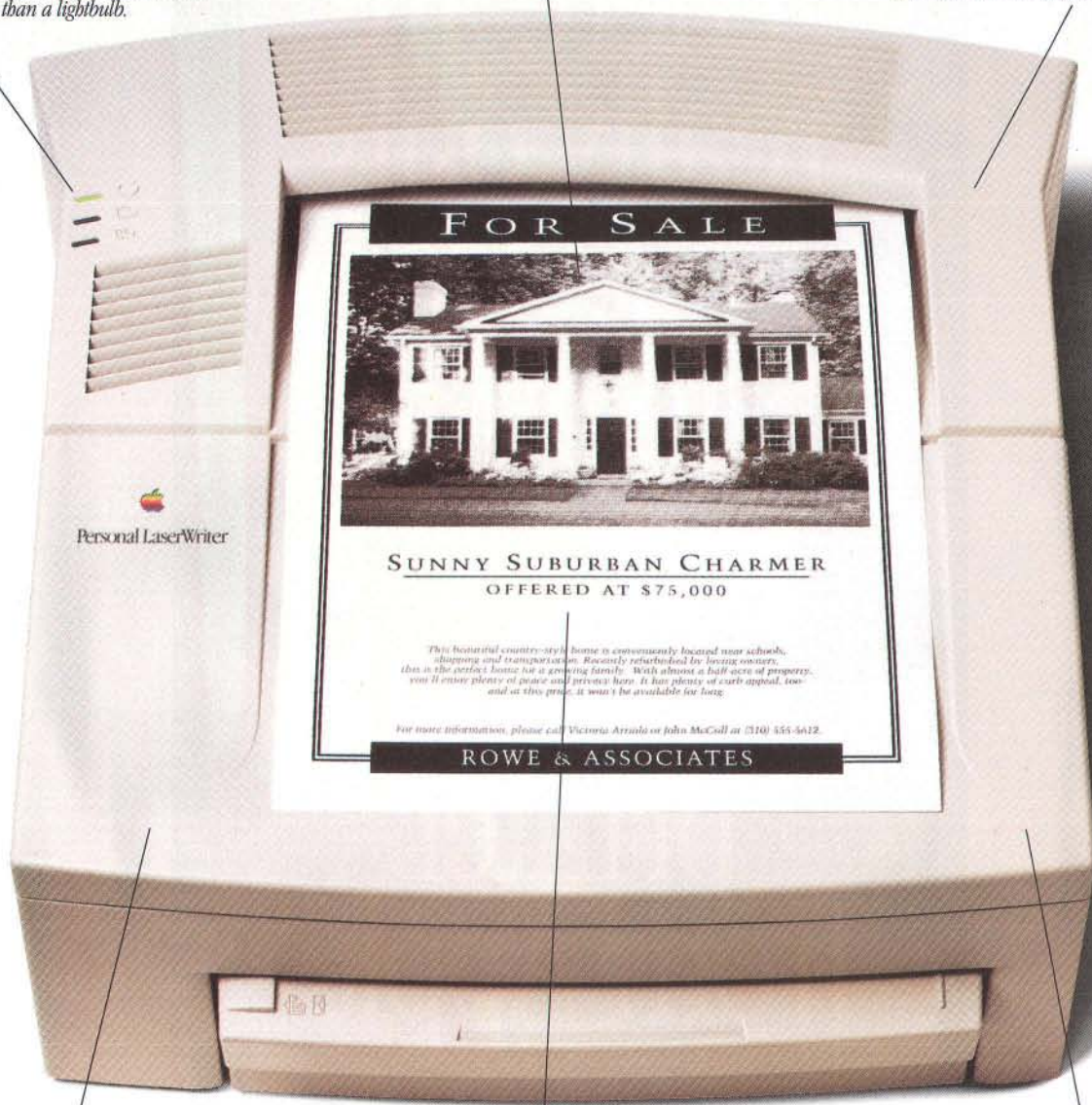
There are
really only
two reasons
to buy
your next
personal
printer
from Apple.

It does more.

It's more intelligent. The LaserWriter Select[™] 320 complies with the EPA's Energy Star standards. And then some. Our smart "Auto-On" feature means that when it's not in use, the printer uses under 10 watts of power—less than a lightbulb.

It's more expandable. With a simple memory upgrade, you can take advantage of Apple's PhotoGrade[™] technology. You'll get photographic quality that rivals printers of much higher resolution (with price tags to prove it).

It's more streamlined. Thanks to careful Apple[®] industrial design, the LaserWriter Select 320 weighs in at 15 pounds and has a very small footprint, so it easily adapts to your work space (not to mention your work style).



The feature-packed LaserWriter Select 320.

It's more powerful. The LaserWriter Select 320 delivers the advanced capabilities of Adobe[®] PostScript[™] Level 2 (and the speed of a RISC processor). Not surprising for a big-budget printer—but pretty amazing for one at this price.

It's more refined. Apple's FinePrint[™] technology enhances the 300-dpi laser clarity, so you get exceptionally sharp text and graphics—especially in details (such as clean curves) that give your work a more professional look.

It's more personal. The LaserWriter Select 320 is built to work hand in hand with Macintosh[®] computers—which also means it's just as easy for you to use. Just plug your printer in, pop the software in your Mac[®] and click on "Install." It's that simple.

It costs less.

It's less, period. A comparable personal printer such as the Hewlett-Packard LaserJet 4ML will cost you \$1,279 (SRP), while you can take home the LaserWriter Select 320 for only \$959. In other words, you can get a lot more printer for a lot less money. It's that simple.*



The economical LaserWriter Select 320.



MacUser**Labs**

A Printer on Every Desk

Inexpensive printer technologies bring laser-quality output to the comfort and security of your home or office.

By Tony Bojorquez and Rik Myslewski

A few short years ago, everyone had a personal desktop printer. It was called a typewriter. During this golden age, every office worker enjoyed the convenience and privacy of personal printing; not even the lowliest entry-level clerks had to walk down the hall and wait with the rest of the staff to see their work appear on paper.

The advent of word processing sounded the death knell for that confidant (the typewriter, not the entry-level clerk). Although the keyboard remained, type on paper was replaced by characters on a screen — first green on black, then black on white. And after a brief interlude with daisy-wheel and dot-matrix technologies, laser and inkjet printers emerged as the preferred paths from screen to paper.

But in the early '80s, when a \$1,000+ IBM Selectric typewriter seemed plenty expensive, the Apple LaserWriter checked in at a cool \$6,999 — far too costly for personal use. It took nearly ten years of engineering and price adjustments for a Mac/printer combo to cost about the same as that '80s-priced professional office typewriter. But it finally made it. It's now time to finish the word-processing revolution. It's time to put a personal desktop printer on every person's desk.

We found 13 personal printers you can buy for less than \$1,000 apiece and 6 others that cost a few hundred dollars more. Of the 19 printers, 16 use laser technology and 3 use inkjet. Laser printers produce better-looking output, but inkjet printers cost less (although the cost differential has narrowed considerably).

There are two types of printing preparation: QuickDraw and PostScript. QuickDraw is perfectly acceptable if all you print is correspondence, reports, and spreadsheets; PostScript is useful if your work includes complex graphics files such as those created with page-layout and drawing applications.

QuickDraw printing relies on your Mac to turn the image to be printed into a *bit map* — a collection of dots that the printer places on the page — in a process that uses a *raster-image processor*, or *RIP*. You need TrueType fonts or Adobe Type Manager or some other font-smoothing technology to enable a QuickDraw printer to create smooth text, and the speed of the entire process is dependent on your Mac's power and RAM.

Although QuickDraw printers cost less than PostScript ones, you may be disappointed if you use a QuickDraw printer for documents that contain EPS (Encapsulated PostScript) files or files that were created in PostScript-based applications



such as Adobe Illustrator or Aldus FreeHand. QuickDraw printers print these at a resolution of 72 dpi (dots per inch) — the resolution that you see on your screen — rather than at the 300- or 360-dpi resolution most of them are capable of. Images that appear acceptable on-screen may be jagged on paper.

PostScript, on the other hand, aids in both the speed of processing and the quality of the resulting image. Instead of relying on your Mac's processor to perform the time-consuming RIPing and on your Mac's RAM to provide the space to do so, a PostScript printer contains its own processor and RAM — your Mac is free to get back to work as soon as it sends a page to the printer. You need Apple or Adobe *driver software* to translate QuickDraw information from your Mac into PostScript code and send the code to the printer's PostScript *interpreter*. The interpreter uses this code to create a bit map that prints smoothly at the printer's resolution. Driver software is provided with every PostScript printer we tested.

Deceptive Documentation

Whether you choose laser or inkjet, QuickDraw or PostScript, we believe that installing a printer should be as painless as possible.

A packing list and warranty should be among the first things you encounter when you open the box your printer comes in. Manuals should be informative and easy to understand, with a technical-support number in plain view. Most of the printers we tested for this report were accompanied by acceptable packaging and manuals; those of the Hewlett-Packard LaserJet 4ML and the Apple LaserWriter Select 360 were especially good.

Less successful in this regard was the Brother HJ-400 printer, which came with two DOS-oriented manuals barely sprinkled with Macintosh information. A Windows and Macintosh addendum helped a bit but appeared to have been written by someone who had little familiarity with the Macintosh.

The worst was the documentation for the NEC Silentwriter 1097, which was, at best, disingenuous. Although the Silentwriter 1097 is touted as a true 600-dpi printer, its images did not appear to have 600-dpi resolution. A call to NEC eventually uncovered the truth: The Silentwriter 1097 is actually a 300-x-600-dpi printer that uses a software-based scheme called *interpolation* to approximate true 600-dpi printing. Pretty sneaky, guys.

It's a Snap

Plug-and-play is not just an ideal for personal printers; it's a must. We're happy to announce that messy toner installation, for one, is a thing of the past. However, not all consumables are

created equal (see the "How We Tested" sidebar).

All three inkjet printers use ink cartridges that are easy to install. Six of the laser printers use a single unit that contains the printer's *consumables*: toner, drum, and developer. Although this may seem like an efficient arrangement, if you frequently print page-covering graphics, you may run out of toner before the drum life ends (it's unlikely that the drum life will end before you run out of toner). With a one-piece setup, when you run out of toner, you must purchase an entire new consumables unit.

The other ten laser printers — all six of the GCC printers, the MacFriends QuickorTS, the Sharp JX-9460PS, and the Texas Instruments microLaser Pro 600 PS23 and microWriter PS65 — have two-unit consumables, with toner separate from the drum and developer.

The HP LaserJet 4ML's EconoMode draft mode goes one step further in efficiency by using only half the toner of standard printing. The print quality may be less than optimal, but it's perfectly acceptable for draft documents.

Speed Is Key

The rated engine speed printer vendors advertise is simply the time it takes to move a letter-sized piece of paper through the printer engine and to the output tray. It doesn't include the time it takes the Mac to process the print data and send it to the printer, nor does it include the preparation time the printer needs before it prints each page. The more complex the image, the longer it takes to process. If you want to print a complex image on an inkjet printer — or even on a slow laser printer — it may take a very long time indeed (see figure 1). Those with a more powerful Mac than our IICI test unit, however, should be able to achieve faster QuickDraw-printer speeds.

Text. A simple document requires little processing or transmission time. Our simplest test document was a 20-page Microsoft Word document that had only a single font, Times, which is resident in each of the PostScript printers we tested. As expected, the printers with the higher-rated engines were the fastest. The Apple LaserWriter Select 360, rated at 10 ppm (pages per minute), took top honors, with the 10-ppm NEC Silentwriter 1097 and 9-ppm TI microLaser Pro 600 PS23 following close behind.

The printers with 4-ppm engines were among the slowest of the laser printers, with GCC's 4-ppm BLP Eclipse 4 and PLP II bringing up the rear.

The inkjet printers, with their slower engines, fell well behind the laser printers on this test. Although the Apple StyleWriter II was the fastest inkjet printer by almost a minute, it was significantly slower than the slowest laser printer. The Brother HJ-400 inkjet printer redefines *slow*, with speed we had to rate not in pages per minute but in minutes per page. It took the HJ-400 more than 60 minutes to print our 20-page document. To be fair, we must note that we ran our tests with

The Bottom Line

NOW IS THE RIGHT TIME TO BUY, if you're in the market for a low-cost personal printer. We judged this batch of 19 printers on price/performance, ease of installation, documentation, and output quality. Although inkjet printers' prices are lower than ever, the price difference between inkjet and laser printers is small enough these days to make laser printers a much more attractive alternative.

⊕ = OUTSTANDING

● = ACCEPTABLE

⊖ = POOR

PRICE/
PERFORMANCE

OUTPUT
QUALITY

PRINTING
SPEED

★★★★ Apple LaserWriter Select 360 (PL) ⊕ ⊕ ⊕



The sharpest text and best output quality came from the Apple LaserWriter Select 360 (\$1,499 list, \$1,425 street). This PostScript laser printer not only garnered the highest rating from our jury of printer experts but was also one of the top performers in all of our tests. Several years ago, this printer would have easily cost three times what it does today.

★★★★ HP LaserJet 4ML (PL) ⊕ ● ●



The best overall value among PostScript laser printers is the Hewlett-Packard LaserJet 4ML (\$1,279 list, \$975 street). This compact, well-designed printer comes standard with 4 megabytes of RAM and excellent text quality, thanks to HP's Resolution Enhancement Technology. The LaserJet 4ML is Energy Star-compliant and offers the EconoMode draft mode for dramatic toner savings.

★★★★ GCC PLP II (QL) ⊕ ● ●



The best entry-level printer is the GCC PLP II (\$659 list, \$475 street). This QuickDraw laser printer offers laser-quality text at an affordable price. Keep in mind the limitations, however: Although you get sharp-looking text, EPS graphics files print at a jagged 72 dpi.

| | | | |
|--|---|---|---|
| ★★★★ Apple Personal LaserWriter 320 (PL) | ⊕ | ● | ● |
| ★★★★ TI microLaser Pro 600 PS23 (PL) | ● | ⊕ | ● |
| ★★★★ Digital DECLaser 1152 (PL) | ⊕ | ● | ● |
| ★★★★ GCC BLP Elite 8 (PL) | ● | ● | ● |
| ★★★★ MacFriends QuickorTS (PL) | ● | ● | ● |
| ★★★★ Apple StyleWriter II (QI) | ● | ● | ● |
| ★★★★ GCC BLP Eclipse 4 (PL) | ● | ● | ● |
| ★★★★ GCC BLP Elite 4 (PL) | ● | ● | ● |
| ★★★★ GCC PLP IIS (QL) | ● | ● | ● |
| ★★★★ NEC Silentwriter 1097 (PL) | ● | ● | ⊕ |
| ★★★★ TI microWriter PS65 (PL) | ● | ● | ● |
| ★★★★ Apple LaserWriter Select 300 (QL) | ● | ● | ● |
| ★★★★ GCC BLP Eclipse 8 (PL) | ⊖ | ● | ● |
| ★★★★ HP DeskWriter (QI) | ● | ● | ● |
| ★★★★ Sharp JX-9460PS (PL) | ● | ⊖ | ● |
| ★★★★ Brother HJ-400 (QI) | ⊖ | ⊖ | ⊖ |

PL = PostScript or PostScript-clone laser QL = QuickDraw laser QI = QuickDraw inkjet

Listing is alphabetical within groups of equal mouse ratings.

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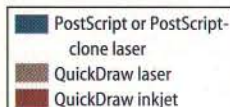
figure 1

Printer Speed / start your engines

Good-quality, fast printing at attractive prices is the hallmark of these personal printers. MacUser Labs used a suite of documents created in Microsoft Word 5.1, Microsoft Excel 4.0, and Aldus PageMaker 5.0 to test printer speed. We weighted the tests more toward word-processing tasks. The printers are ranked in the order of their overall

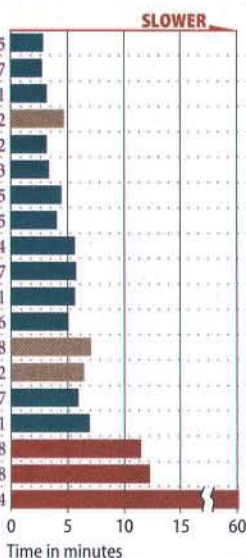
performance. Keep in mind that whereas PostScript printers use an on-board processor to image documents, QuickDraw printers rely on the Mac's processor and RAM (in this case, a Mac IIci with 8 megabytes of RAM and an 80-megabyte hard drive); printer-engine speed is independent of where document imaging occurs.

MacUser Labs



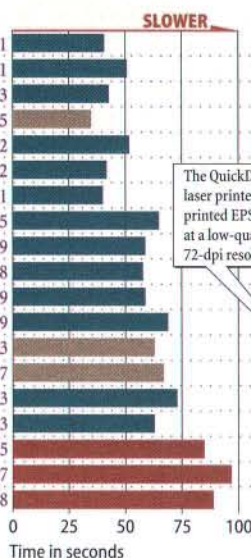
Word

Our 20-page Word document tests raw engine speed. Top honors went to the 10-ppm Apple LaserWriter Select 360 and NEC Silentwriter 1097.



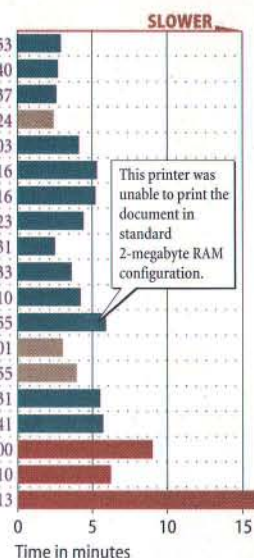
Excel

Our Excel document included data and charts as well as text. This document tests a combination of raster-image-processing power and engine speed.



PageMaker

Our PageMaker document — with its TIFF image, EPS files, gray-scale ramps, and downloadable fonts, tests a printer's (or the Mac's) processing power.



✓ MacUser RECOMMENDS

a replacement driver; Brother's original driver was faster but had unacceptable letterspacing problems. A Brother representative assured us the company is working on a new and improved driver.

Charts and Data. Spreadsheets often contain not just text but also lines and charts that tax the processing power of a printer — or of your Mac. In our Excel tests, the QuickDraw GCC PLP IIS was the fastest, beating out the 300-dpi PostScript GCC BLP Eclipse 8 and the 300-x-600-dpi PostScript NEC Silentwriter 1097, which tied for second. Less than two seconds behind was a true 600-dpi printer: the TI microLaser Pro 600 PS23 — an impressive performance, considering that 600-dpi printers have to process four times as much information (360,000 dots per square inch) as 300-dpi printers (90,000 dots per square inch).

Again, the inkjet printers placed behind the laser ones, but the Apple StyleWriter II took only 12 seconds longer than the slowest laser printer in this test, the Digital DEClaser 1152. The software-based interpreter in the StyleWriter II's driver processed the information at speeds comparable to those of a hardware-based interpreter.



Apple LaserWriter Select 300

Rating: ★★
List Price: \$730.
Street Price: \$700.
Pros: Excellent blacks.
Cons: Slow. Not upgradable.
Technology: Laser.
Imaging Model: QuickDraw.
No. of Fonts Included: 39.
Interfaces: Serial.
RAM (Std./Max.): 512K/512K.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$89/4,000 pages.
Size (L x W x H): 15 x 15 x 6.5 in.
Weight: 15 lb.
Warranty: 1 year.
Company: Apple Computer, Cupertino, CA; 800-538-9696 or 408-996-1010.



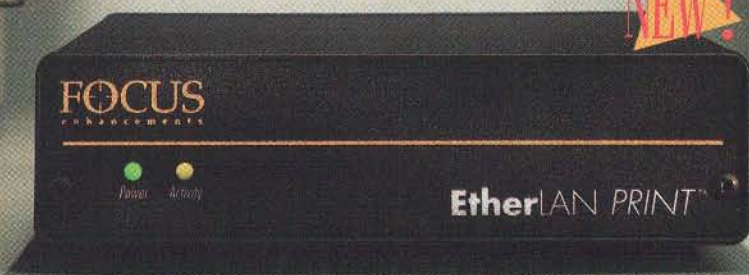
Apple LaserWriter Select 360

Rating: ★★★★★
List Price: \$1,499.
Street Price: \$1,425.
Pros: Best image quality. Fast, 10-ppm engine. Energy Star-compliant. Supports PCL. 7 MB of RAM standard.
Cons: Expensive.
Technology: Laser.
Imaging Model: PostScript Level 2.
No. of Fonts Included: 64.
Interfaces: Serial, parallel, LocalTalk.
RAM (Std./Max.): 7 MB/16 MB.
Engine Res.: 600 dpi.
Consumables: Toner cartridge, \$89/4,000 pages.
Size (L x W x H): 18.5 x 15 x 8 in.
Weight: 26 lb.
Warranty: 1 year.
Company: Apple Computer, Cupertino, CA; 800-538-9696 or 408-996-1010.

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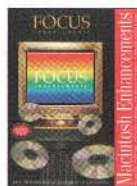
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How We Tested / *how many pages can you really print?*

MacUser Labs

WITHOUT THE PROPER GUIDANCE, setting up a personal printer can become a personal nightmare, so we evaluated each printer for its documentation, packaging, and ease of installation. No matter how easy it is to set up, though, if a printer is as slow as a dog and has lousy output, it's not worth a dime.

To test the overall speed of these low-cost personal printers, MacUser Labs printed a 20-page Microsoft Word 5.1 document, a Microsoft Excel 4.0 spreadsheet with charts, and a complex Aldus PageMaker 5.0 document. Our test unit was a Mac IIci with 8 megabytes of RAM and an 80-megabyte hard drive. In addition to testing each printer's speed, we showed the PageMaker documents to our panel of experts and asked them to judge each printer's output quality.

Perhaps the most-personal experience you'll have with your printer is the one that involves your pocketbook. In addition to making the initial purchase, you'll eventually need to buy more ink and toner cartridges. Most engine manufacturers estimate how many pages you can expect from an ink or toner cartridge — for example, 4,000 pages at 5-percent page coverage. We weren't sure if users or vendors were sure exactly what "5-percent page coverage" meant — neither were we. To test the accuracy of these ratings, MacUser Labs devised a method to measure page coverage exactly.

To discover the exact pixel count of each test page, we used

TeleTypesetting's TScript 3.3 RIP software to save our test files to disk in PICT format. We then opened them in Adobe Photoshop 2.5.1 and used the Selection Info Filter from HSC's Kai's Power Tools 2.0 to count the pixels. By comparing the total number of pixels available on a page to the number of pixels actually in a page of the Word document, we were able to create a Word document with exactly 5-percent coverage. By way of comparison, our Excel document and PageMaker document had about 7-percent and 14-percent coverage, respectively.

To test the accuracy of manufacturers' claims for how long consumables last, we selected four different printer engines, represented by the Apple LaserWriter Select 360, HP LaserJet 4ML, Digital DEClaser 1152, and Apple StyleWriter II. We outfitted the printers with new cartridges and printed our Word document until the quality became unacceptable. We took the final page count, which ranged from 525 to 3,890, and compared it with the manufacturer's ratings (see the chart).

The StyleWriter II, with its inkjet cartridge, was the only printer that exceeded its rating. Although the other three fell below the manufacturers' projections, keep in mind that printer dot size, toner-density setting, toner grade, humidity, and paper quality may influence results. Most important, however, you should know that if you're printing files with lots of graphics, you're sure to see fewer pages per cartridge than a manufacturer's rating indicates. / Roman Victor Loyola

Improving Your Image. Our next test ranged beyond the normal use of a personal printer and for this reason carried less weight in our overall-performance rankings. A PageMaker document containing EPS graphics, scanned TIFF images, downloadable fonts, and hairline graphics simulated a real-world page layout and exercised the ability of each printer to

handle multiple elements in a single printing job.

Because QuickDraw printers do not support PostScript graphics, they have less work to do but produce poorer-quality output: PostScript graphics print as jagged 72-dpi bit maps. The QuickDraw GCC PLP II and PLP IIS were as fast as many of the PostScript printers, but the image quality of the



Apple Personal LaserWriter 320

Rating: ★★★★★

List Price: \$959.

Street Price: \$925.

Pros: PhotoGrade available with 6-MB RAM upgrade (\$349). Energy Star-compliant.

Technology: Laser.

Imaging Model: PostScript Level 2.

No. of Fonts Included: 35.

Interfaces: LocalTalk.

RAM (Std./Max.): 2 MB/8 MB.

Engine Res.: 300 dpi.

Consumables: Toner cartridge, \$79/4,000 pages.

Size (L x W x H): 15 x 15 x 6.5 in.

Weight: 15.5 lb.

Warranty: 1 year.

Company: Apple Computer, Cupertino, CA; 800-538-9696 or 408-996-1010.



Apple StyleWriter II

Rating: ★★★★★

List Price: \$359.

Street Price: \$320.

Pros: Inexpensive. Best inkjet text and graphic-image quality. Small footprint.

Cons: Slow.

Technology: Inkjet.

Imaging Model: QuickDraw.

No. of Fonts Included: 39.

Interfaces: Serial.

RAM (Std./Max.): 128K/128K.

Engine Res.: 360 dpi.

Consumables: Ink cartridge, \$22/500 pages.

Size (L x W x H): 13.5 x 8 x 7 in.

Weight: 7 lb.

Warranty: 1 year.

Company: Apple Computer, Cupertino, CA; 800-538-9696 or 408-996-1010.



Brother HJ-400

Rating: ★★

List Price: \$399.

Street Price: \$325.

Pros: Energy Star-compliant.

Cons: Slowest printer. Poor driver software.

Technology: Inkjet.

Imaging Model: QuickDraw.

No. of Fonts Included: 18.

Interfaces: Serial, parallel.

RAM (Std./Max.): 64K/64K.

Engine Res.: 360 dpi.

Consumables: Ink cartridge, \$25/1 million characters.

Size (L x W x H): 14.5 x 12 x 11 in.

Weight: 9 lb.

Warranty: 2 years.

Company: Brother International, Somerset, NJ; 800-276-7746 or 908-356-8880; 714-859-2272 (fax).



Digital DEClaser 1152

Rating: ★★★★★

List Price: \$699.

Street Price: \$699 (direct).

Pros: Inexpensive. Supports PCL.

Technology: Laser.

Imaging Model: PostScript Level 2.

No. of Fonts Included: 17.

Interfaces: Serial, parallel, LocalTalk.

RAM (Std./Max.): 2 MB/4 MB.

Engine Res.: 300 dpi.

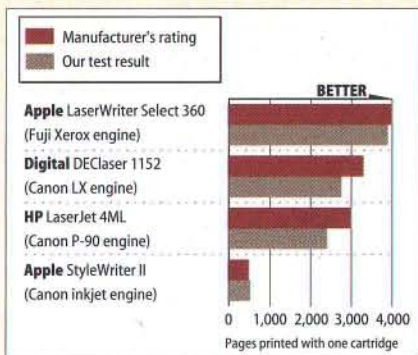
Consumables: Toner cartridge, \$33/3,300 pages.

Size (L x W x H): 16 x 14 x 8 in.

Weight: 25 lb.

Warranty: 1 year.

Company: Digital Equipment Corp., Maynard, MA; 800-777-4343 or 508-493-5111; 800-234-2298 (fax).



The Apple StyleWriter II was the only printer whose cartridge outperformed its manufacturer's rating.

We created a Word document with exactly 5-percent page coverage to test manufacturers' page-per-cartridge claims.

Our PageMaker document covered about 14 percent of the page — almost three times as much as our Word test document.

PostScript graphics they printed was poor. The RISC-based Apple LaserWriter Select 360, HP LaserJet 4ML, NEC Silentwriter 1097, and TI microLaser Pro 600 PS23 sped to the front of the PostScript-printer lineup. The slower GCC BLP Eclipse 4 and BLP Eclipse 8 and the Digital DEClaser 1152 took about twice as long to print as the fastest printers. The TI

microWriter PS65, which comes with 2 megabytes of RAM, needed more RAM before it could print the test page. When brought up to 4.5 megabytes of RAM, the microWriter PS65 was still the slowest laser printer. If desktop publishing is your stock in trade, avoid this printer.

The microLaser Pro 600 PS23 was already one of the fastest printers in this test, but you can accelerate the processing of complex graphics even more with a \$349 Texas Instruments PowerStep upgrade card. Preliminary testing showed only the PageMaker document benefiting from the card's presence on the printer's motherboard — but that document printed a full 25 percent faster. If you buy this printer and plan to print a lot of complex graphics and images, we recommend that you purchase a PowerStep as well.

Although the Sharp JX-9460PS uses a high-quality PostScript clone, PhoenixPage, it was unable to print the PostScript graphics in the PageMaker document, producing instead 72-dpi bit maps identical to those from the QuickDraw printers. A Sharp representative said the company is aware of the problem and should have a fix ready by the time you read this.

The Brother HJ-400 inkjet printer took more than 15 minutes to print the document and turned the TIFF elements into negative images. A Brother representative could only say that the company was working on it . . .

Picture Perfect

When it comes to output quality, you deserve the best, even when a printer is purely personal, right? With the 600-dpi Apple LaserWriter Select 360 and TI microLaser Pro 600 PS23,



GCC BLP Eclipse 4

Rating: ★★
List Price: \$1,099.
Street Price: \$850.
Pros: All ports active.
Cons: Slowest toner-based printer.
Technology: Laser.
Imaging Model: PhoenixPage Level 2.
No. of Fonts Included: 17.
Interfaces: Serial, parallel, LocalTalk.
RAM (Std./Max.): 2 MB/6 MB.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).



GCC BLP Eclipse 8

Rating: ★★
List Price: \$1,799.
Street Price: \$1,450.
Pros: All ports active.
Cons: Expensive.
Technology: Laser.
Imaging Model: PhoenixPage Level 2.
No. of Fonts Included: 35.
Interfaces: Serial, parallel, LocalTalk.
RAM (Std./Max.): 2 MB/6 MB.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).



GCC BLP Elite 4

Rating: ★★
List Price: \$879.
Street Price: \$745.
Pros: Inexpensive.
Technology: Laser.
Imaging Model: PostScript Level 1.
No. of Fonts Included: 17.
Interfaces: Serial, parallel, LocalTalk.
RAM (Std./Max.): 2 MB/4 MB.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).



GCC BLP Elite 8

Rating: ★★
List Price: \$1,199.
Street Price: \$975.
Pros: Fast 8-ppm engine.
Technology: Laser.
Imaging Model: PostScript Level 1.
No. of Fonts Included: 17.
Interfaces: Serial, parallel, LocalTalk.
RAM (Std./Max.): 2 MB/4 MB.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).

you've got it. Our jury found the crisp text, sharp hairlines, and excellent gray-scale images these printers produced as good as or better than those from printers many times their price (see figure 2).

The other two 600-dpi printers did not fare nearly as well. As mentioned above, the NEC Silentwriter 1097 isn't a true 600-dpi printer; it interpolates from 300 x 600 dpi. NEC's Photo-Match gray-scale technology was also a disappointment — and the fact that you can use it only when the Silentwriter 1097 is set to 300 x 300 dpi is nowhere to be found in the manual: It's stuffed away in a Read Me file on one of the installation disks.

The Sharp JX-9460PS presented an interesting challenge to our jurors. The quality of the 600-dpi text output and gray-scale images it produced received high praise, but the printer was unable to correctly print the EPS graphics that had been imported into the PageMaker 5.0 document.

The HP LaserJet 4ML, with Resolution Enhancement Technology (RET), and the Apple Personal LaserWriter 320, with FinePrint, produced higher-quality text output than the other 300-dpi printers. An optional 6-megabyte RAM card (\$349) enabled the Personal LaserWriter 320 to produce gray-scale images on a par with those from the best 600-dpi printers.

Although inkjet technology has improved, our jury still dropped the three inkjet printers into the last three places. Among them, the 360-dpi Apple StyleWriter II produced the sharpest text and graphics, with minimal wrinkling and ink bleeding. The HP DeskWriter produced heavy-looking text and graphics, and the Brother HJ-400 again secured its position as the least desirable printer, with mediocre text quality and poor image quality.

Take It Home

Coupling a personal printer to your Mac can provide high-quality, high-speed output of text and complex graphics undreamed of during the Typewriter Age. The Apple LaserWriter Select 360 and the NEC Silentwriter 1097 even offer the option of turning your personal printer into a PostScript-capable fax machine — try that with an IBM Selectric.

In our opinion — and as indicated by the results of our testing — the best personal printer you can buy is the Apple LaserWriter Select 360 (\$1,425 street). It prints beautifully, it's fast, and it's solidly built.

If the LaserWriter Select 360 is a bit too pricey for you, pick up a Hewlett-Packard LaserJet 4ML (\$975 street). With 4 megabytes of RAM standard, text-perfecting RET, a toner-saving draft mode, and power-saving Energy Star capability, the LaserJet 4ML is the best printer you can get for less than \$1,000. (While we were in the middle of testing, HP unveiled the LaserJet 4MP, a 600-dpi printer with a 4-ppm engine, which will sell for around \$1,400.)

If you're looking for the least expensive way to put a personal printer on your desk, we recommend that you bite the bullet and spring for a GCC PLP II (\$475 street). The \$320 Apple StyleWriter II may be the best of the inkjet printers, but the extra \$150 you'll spend for the PLP II's laser quality and speed will be worth it in the long run.

Tony Bojorquez is a MacUser Labs project leader. Rik Myslewski is *MacUser's* executive editor. Roman Victor Loyola, a MacUser Labs technician, managed the testing for this report.



GCC PLP II

Rating: ★★★★★
List Price: \$659.
Street Price: \$475.
Pros: Least expensive laser printer.
Cons: EPS graphics files print at 72 dpi.
Technology: Laser.
Imaging Model: QuickDraw.
No. of Fonts Included: 0.
Interfaces: SCSI.
RAM (Std./Max.): NA.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).



GCC PLP IIS

Rating: ★★★★★
List Price: \$879.
Street Price: \$700.
Pros: Fast 8-ppm engine.
Cons: EPS graphics files print at 72 dpi.
Technology: Laser.
Imaging Model: QuickDraw.
No. of Fonts Included: 0.
Interfaces: SCSI.
RAM (Std./Max.): NA.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$33/2,500 pages; drum, \$289/15,000 pages.
Size (L x W x H): 18 x 18 x 5.25 in.
Weight: 24 lb.
Warranty: 1 year.
Company: GCC Technologies, Inc., Bedford, MA; 800-422-7777 or 617-275-5800; 617-275-1115 (fax).



HP DeskWriter

Rating: ★★★★★
List Price: \$365.
Street Price: \$320.
Pros: Inexpensive. 3-year warranty.
Cons: Lowest text-output quality. Slow.
Technology: Inkjet.
Imaging Model: QuickDraw.
No. of Fonts Included: 35.
Interfaces: Serial, LocalTalk.
RAM (Std./Max.): 64K/64K.
Engine Res.: 300 dpi.
Consumables: Ink cartridge, \$32/1,000 pages.
Size (L x W x H): 17.3 x 14.8 x 8 in.
Weight: 14.5 lb.
Warranty: 3 years.
Company: Hewlett-Packard, Cupertino, CA; 800-752-0900 or 208-323-2551; 208-344-4809 (fax).



HP LaserJet 4ML

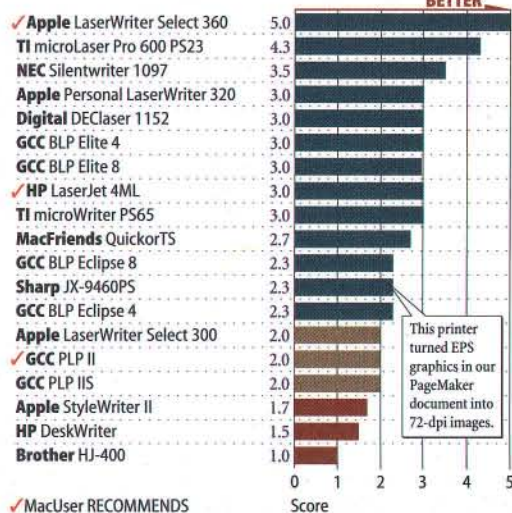
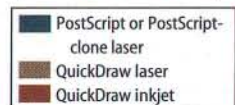
Rating: ★★★★★
List Price: \$1,279.
Street Price: \$975.
Pros: RET produces sharp text. EconoMode saves toner. Energy Star-compliant. Supports PCL.
Technology: Laser.
Imaging Model: PostScript Level 2.
No. of Fonts Included: 80.
Interfaces: Parallel, LocalTalk.
RAM (Std./Max.): 4 MB/4 MB.
Engine Res.: 300 dpi.
Consumables: Toner cartridge, \$89/3,000 pages.
Size (L x W x H): 14.5 x 14 x 6.5 in.
Weight: 15.5 lb.
Warranty: 1 year.
Company: Hewlett-Packard, Cupertino, CA; 800-752-0900 or 208-323-2551; 208-344-4809 (fax).

figure 2

Output Quality / looking good

MacUser Labs

We asked a jury of experts to judge the output quality of text, graphics, and gray-scale ramps in our PageMaker document and rate it on a scale of 0 to 5. The type of printing technology a printer uses has a tremendous influence on output quality. We were not surprised to find that QuickDraw inkjet and laser printers received the lowest ratings and that PostScript and PostScript-clone laser printers garnered the highest. We found that output quality was similar for the QuickDraw laser printers.



✓ MacUser RECOMMENDS

suscrip
aliquip ex
on-sequat.
vel eum



Best

hen-drerit
velit esse
equat, vel
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Worst

PostScript and PostScript-Clone Laser-Printer Output

Best: Apple LaserWriter Select 360.

This 600-dpi printer produced sharp text and excellent gray-scale images.

Worst: GCC BLP Eclipse 4.

Although its text quality was acceptable, this printer's output was darker than that of the other 300-dpi printers.

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Best

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Worst

Inkjet-Printer Output

Best: Apple StyleWriter II.

The 360-dpi StyleWriter II is the best of the inkjet printers, which all fared poorly with our jury of experts. Apple's GrayShare technology helped improve the quality of graphic images.

Worst: Brother HJ-400.

The driver software that came with the HJ-400 not only produced slow results but also inverted our graphic image. The result is like looking at a negative of a picture.



TI microWriter PS65

Rating: ★★

List Price: \$1,099.

Street Price: \$1,050.

Pros: Includes 65 fonts. Supports PCL. Energy Star-compliant.

Technology: Laser.

Imaging Model: PostScript Level 1.

No. of Fonts Included: 65.

Interfaces: Serial, LocalTalk.

RAM (Std./Max.): 2 MB/4.5 MB.

Engine Res.: 300 dpi.

Consumables: Toner cartridge, \$49/2,500 pages; imager cartridge, \$169/15,000 pages.

Size (L x W x H): 14.8 x 13.8 x 10.4 in.

Weight: 33 lb.

Warranty: 1 year.

Company: Texas Instruments, Inc., Austin, TX; 800-527-3500 or 512-794-5970; 512-250-7329 (fax).



MacFriends QuickortS

Rating: ★★

List Price: \$1,099.

Street Price: \$890.

Pros: Inexpensive. Fast 9-ppm engine. Supports PCL.

Technology: Laser.

Imaging Model: PostScript Level 2.

No. of Fonts Included: 35.

Interfaces: Serial, parallel, LocalTalk.

RAM (Std./Max.): 4 MB/8 MB.

Engine Res.: 300 dpi.

Consumables: Toner cartridge, \$59/3,000 pages; developer, \$129/25,000 pages; drum, \$129/85,000 pages.

Size (L x W x H): 14.8 x 13.4 x 10.5 in.

Weight: 34 lb.

Warranty: 2 years.

Company: MacFriends, Portland, OR; 800-331-1322 or 503-286-9350; 503-286-8710 (fax).



NEC Silentwriter 1097

Rating: ★★

List Price: \$1,499.

Street Price: \$1,475.

Pros: Fast 10-ppm engine. Supports PCL. 7 MB of RAM standard.

Cons: Poor documentation.

Technology: Laser.

Imaging Model: PostScript Level 2.

No. of Fonts Included: 35.

Interfaces: Serial, parallel, LocalTalk.

RAM (Std./Max.): 7 MB/9 MB.

Engine Res.: 300 x 600 dpi.

Consumables: Toner cartridge, \$240/8,000 pages.

Size (L x W x H): 18.6 x 15 x 10.4 in.

Weight: 42 lb.

Warranty: 1 year.

Company: NEC Technologies, Inc., Boxborough, MA; 800-388-8888 or 508-264-8000; 508-264-8673 (fax).



Sharp JX-9460PS

Rating: ★★

List Price: \$1,199.

Street Price: \$1,075.

Pros: Inexpensive. Supports PCL.

Cons: Poor PPD software.

Technology: Laser.

Imaging Model: PhoenixPage Level 1.

No. of Fonts Included: 62.

Interfaces: Parallel, LocalTalk.

RAM (Std./Max.): 2 MB/9 MB.

Engine Res.: 600 dpi.

Consumables: Toner cartridge, \$210/15,000 pages; photoconductor cartridge, \$190/30,000 pages.

Size (L x W x H): 14.4 x 13 x 10.5 in.

Weight: 27 lb.

Warranty: 1 year.

Company: Sharp Electronics Corp., Mahwah, NJ; 800-237-4277 or 201-529-9593; 201-529-9637 (fax).



TI microLaser Pro 600 PS23

Rating: ★★

List Price: \$1,599.

Street Price: \$1,370.

Pros: Excellent output. Supports PCL. \$349 PowerStep increases speed.

Technology: Laser.

Imaging Model: PostScript Level 2.

No. of Fonts Included: 23.

Interfaces: Serial, LocalTalk.

RAM (Std./Max.): 6 MB/22 MB.

Engine Res.: 600 dpi.

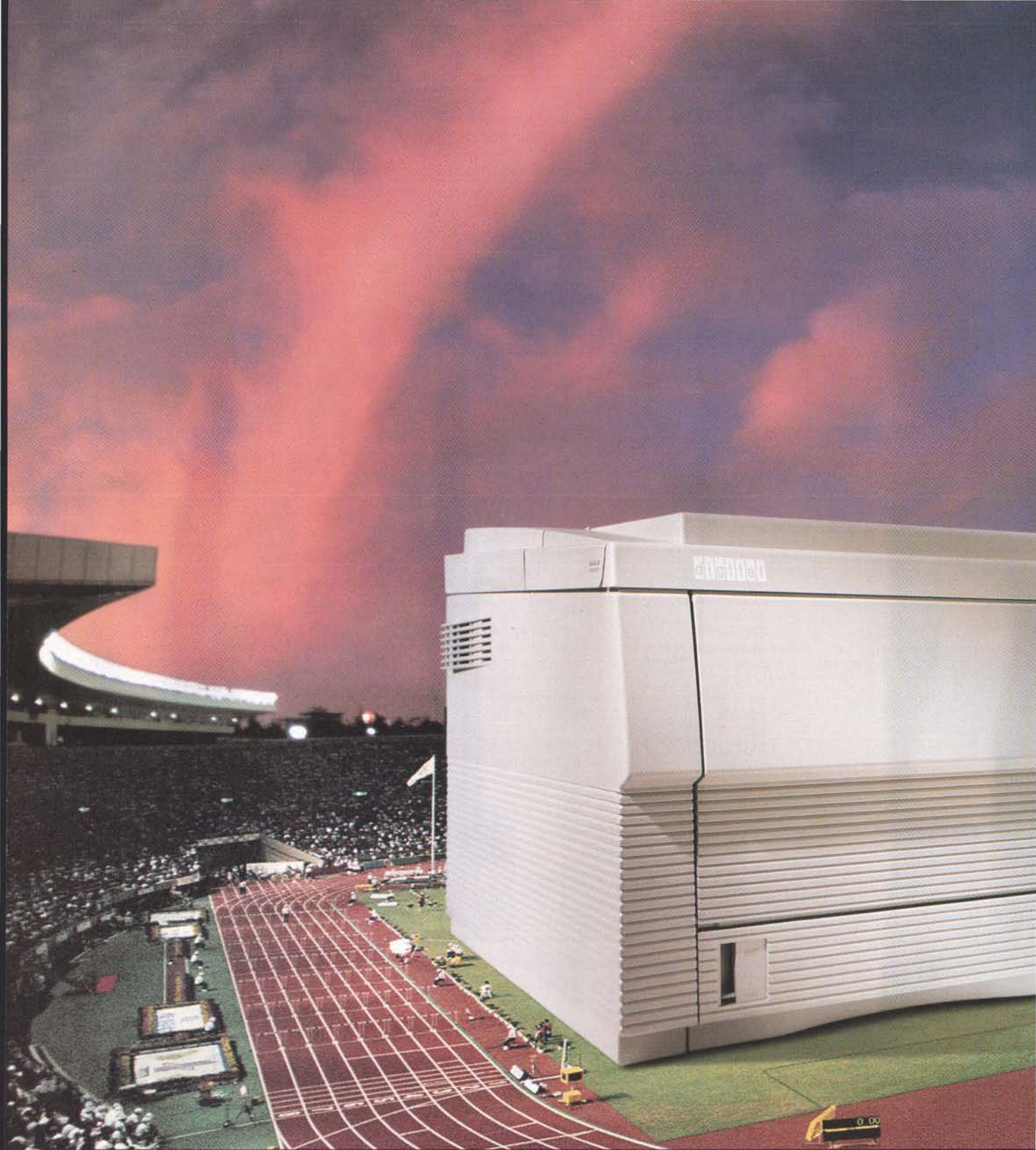
Consumables: Toner cartridge, \$49/2,500 pages; imager cartridge, \$169/15,000 pages.

Size (L x W x H): 14.4 x 13 x 12.8 in.

Weight: 32 lb.

Warranty: 1 year.

Company: Texas Instruments, Inc., Austin, TX; 800-527-3500 or 512-794-5970; 512-250-7329 (fax).



Putting I m a g i n a t i o n

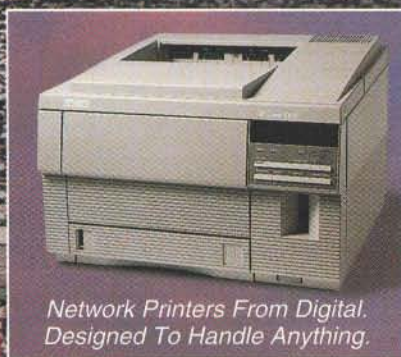


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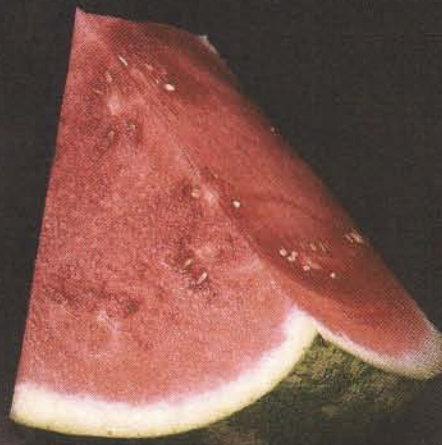
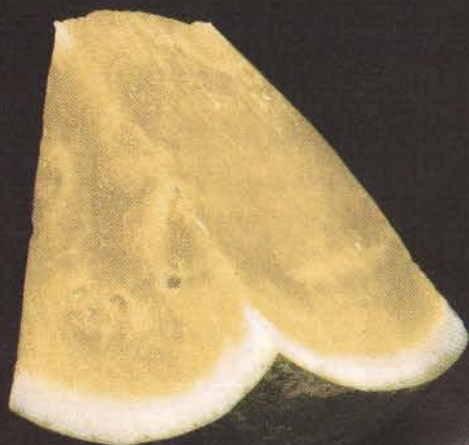
DEClaser 5100 includes:

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- Adobe PostScript® L2 (73 fonts)
- PCL® 5E support (47 fonts)
- RISC and graphical processors
- Serial, parallel and AppleTalk hot ports
- EPA "Energy Star" compliant
- 2 PCMCIA Type II slots
- Optional Ethernet card
- Optional internal hard disk

To Work

digital™

We Scan Corrected.



You expect a scanned image to accurately reflect the color found in your original. Getting there, however, is usually no picnic. After scanning, precious hours are often spent adjusting the image in software to capture the truest blue, a faithful fuchsia, or for example, just the right kind of red in a ripe watermelon. But DCR™ has changed all that.

Now, when you purchase the **new, low-priced ScanMaker® IISp single-pass color scanner**, you also get **DCR, Dynamic Color Rendition**, an advanced, yet easy-to-use color calibration and correction system. DCR actually calibrates the ScanMaker IISp to a photographic industry-accepted calibration target, creating a custom color profile of your

specific scanner, ensuring the most accurate color possible as you scan the image. But don't take our word for it. Here's what *PC Magazine* said in their February 8, 1994 issue: "...this mechanism (DCR) seems to have worked well, because the ScanMaker IISp's color output was clearly the best of any scanner in our survey."

So, even if you need to capture the bright yellow flesh of a Honeyheart watermelon, like the wedge on the left, the quickest way to do it is with the new ScanMaker IISp with DCR.

For more information about the ScanMaker IISp, DCR, your nearest authorized Microtek reseller, or a **FREE** copy of *The Scanned Image* — a scanning primer, call **1-800-654-4160** or fax (310) 297-5050.



The ScanMaker IISp accurately captures millions of brilliant colors at resolutions up to 1200 x 1200 dpi through software interpolation (300 x 600 dpi optically). In addition to the DCR color calibration/correction system, the ScanMaker IISp is bundled with Adobe Photoshop 2.5 LE for either Windows or Macintosh. Windows users also get Caere's PageKeeper Portfolio document and image management software.



Get a hands-on demonstration of the ScanMaker IISp with DCR and find out more about accurate color scanning by attending Focus Seminars' "ColorRight, Color Correction & Reproduction Workshop." For dates and locations, call Microtek at 1-800-654-4160.

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HANDS ON Desktop Publishing

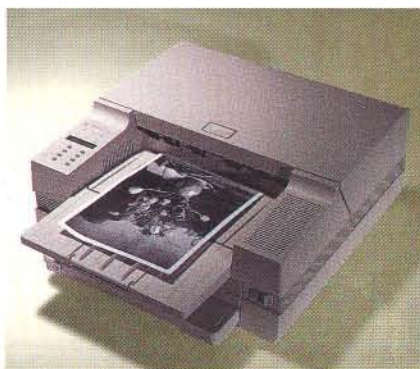
LASER PRINTERS /

DESKTOP CAMERA-READY COPY

NOT ALL DESKTOP-PUBLISHED material is destined for a four-color printing press. Clean gray-scale output is often all that's needed for reproduction at a quick-print or photocopy shop. That's where GCC Technologies' SelectPress 1200 comes in. This 1,200-dpi laser printer gives desktop publishers the high-resolution output required for camera-ready copy at a reasonable price.

The SelectPress scores in a couple of areas. It prints on paper as large as 12 x 19 inches, enough room for full-bleed spreads. Two paper trays — including a somewhat clumsy multipurpose feeder that attaches separately — are provided for a variety of paper sizes and media types. The output samples we printed showed crisp type and detailed halftones.

Design studios and corporate publishing departments will appreciate its functionality in mixed-platform environments. Offering both PostScript Level 2 (PhoenixPage) and PCL 5, the SelectPress automatically switches to the correct language. For networked environments, the SelectPress connects through its serial or parallel ports and supports LocalTalk, EtherTalk, and optional TCP/IP simultaneously — receiving data from one port while holding off the other ports until the current job is completed.



GCC's SelectPress 1200 delivers high-resolution, full-bleed, camera-ready output.

Built around a Toshiba print engine and powered by a 25-megahertz RISC processor, the SelectPress boasts print speeds of 8 ppm for letter pages and 4 ppm for tabloid pages. It ships with 24 megabytes of RAM (expandable to 40) and a 160-megabyte internal hard drive with 135 Monotype PostScript fonts. A SCSI port lets you add an external hard drive for even more font storage.

Priced at \$7,499, the SelectPress enters a competitive market that includes LaserMaster's Unity 1200XL-O (\$8,995), NewGen Systems' ImagerPlus 12 (\$7,495), and Xante's Accel-a-Writer 8100 (\$6,695). 800-422-7777 or 617-275-5800. / Jason Snell

FONTS / ANSWERING TO MULTIPLE MASTERS

A DOBE'S MULTIPLE-MASTER FONT TECHNOLOGY has been overshadowed these days by Apple's impending TrueType GX. But the multiple-master format, which lets you create multiple variations of weight, width, style, and size of a font from two or more core designs, is alive and kicking. Recently, Adobe (800-445-8787 or 415-961-4400) added Viva, Sanvito, Caflisch Script, Graphite, and Tekton (\$89 each) to its multiple-master lineup. Joining the ranks are three more — with the code

names Mezz, designed by Michael Harvey; Baja, by Carol Twombly; and Luna, by Lance Hidy (which is the first font whose serifs grow). Third-party type vendors have jumped on board too: International Typeface Corp. (ITC) puts a new spin on an old favorite with ITC Avant Garde Gothic MM (available from Adobe), and Monotype Typography (312-855-1440) makes waves with Ocean Sans (\$130). By the way, Adobe has lowered its font prices by 25 percent, and other vendors have followed suit. / Pamela Pfiffner

Baja Multiple Master
Mezz Multiple Master
LUNA MM
Viva MM
Caflisch Script MM
Ocean Sans MM

COLOR MANAGEMENT /

EFI OFFERS COLOR WITH THE WORKS

The color-management-system (CMS) wars have settled into strategic negotiations as vendors anticipate the release of Apple's ColorSync 2. But the veteran CMS developer Electronics for Imaging is moving ahead with the release of EfiColor Works, an all-in-one color-management package.

Like the integrated packages that share the Works designation, the EfiColor Works package contains everything you need in order to maintain consistent color throughout your production chain, from scanner to monitor to printer to press. It includes the core EfiColor 2.0 Processor, for handling color matching throughout the system; the new EPS XTension, for matching EPS and DCS files in QuarkXPress; EfiColor for Photoshop, for color matching of native Photoshop files; and EfiColor for Scanners, for calibrating scanners.

For QuarkXPress users, the EPS XTension is notable in that color matching can apply to all graphic types in a page layout — photographs and illustrations, spot colors as well as process colors.

EfiColor Works also contains the entire EfiColor Profile Library — software that contains critical color information about 100 popular peripherals, including monitors (Apple, Ikegami, Radius, and more), printers (Hewlett-Packard, QMS, Tektronix, and others), and printing-press inks (SWOP, Euroscale, and so on). The EfiColor Profile Editor lets you customize these profiles.

Previously, these components were available as part of another software package (an earlier EfiColor XTension shipped with QuarkXPress 3.2) or individually — a printer profile could set you back \$129 or more. EfiColor Works is priced at \$349. Users of EFI's Cachet, EfiColor for Photoshop, or any EfiColor Profile Library package can upgrade for \$79. 800-285-4565 or 415-286-8600. / PP



EfiColor target images let you calibrate your scanner.

Illustrating with Type

Treating symbol fonts as illustrations yields a surprising variety of graphic elements for your publications. BY JANET ASHFORD

WHEN YOU'RE IN A PINCH for graphic elements, the illustrations you need may be at your fingertips in the fonts you use every day. Many fonts contain characters you can use as stand-alone ornaments or manipulate to create decorative borders and handsome illustrations. Recently, there's been a surge in the number of symbol and picture fonts, which instead of containing letters are made up of tiny illustrations. The best known of these, of course, is Zapf Dingbats, but scores more are available, some quite elaborate.

To give you an idea of the versatility of symbol fonts, I chose readily available fonts such as Carta (mapmaking symbols), Woodtype Ornaments 2 (old-style printer's ornaments), and Zapf Dingbats (general symbols and ornaments), all from Adobe Systems.

To save trips to KeyFinder, make a chart for each symbol font you own, showing the characters and their respective keystrokes (type-specimen software is designed for this purpose). Zapf Dingbats, for example, includes 200 characters.

You can use a drawing program to manipulate the following illustrations, but a page-layout program works too. I used Aldus PageMaker 5.0, taking advantage of its reflection and skewing capabilities, features that are also available in QuarkXPress. Remember, too, that you're working with *typefaces* and that rules pertaining to fonts (such as automatically overprinting black) apply to them.

Janet Ashford is coauthor with Linnea Dayton of a forthcoming series of graphics how-to books, to be published by Graphic-sha, of Tokyo.



1 Start with Single Characters

A wide variety of symbol fonts are available these days. Some symbol-font characters are interesting enough to use alone as ornaments. Clockwise from top left, the leaf and square symbols are from Woodtype Ornaments 2, the deer is from Carta, and the pointing-hand and four-leaved dingbats are from Zapf Dingbats.



2 Combine and Reflect

For this simple illustration, I make four copies of the Carta deer symbol, color them medium blue, and place them over a lighter-blue background with a moon drawn by using PageMaker's circle tool. I then select and copy the four deer and use the mirror tool on PageMaker's Control Palette to flip them across the horizontal axis. I color these reflected deer dark blue and place them on a medium-blue background to create the illusion of running deer reflected in water.



3 Add Color

Adding color to picture fonts transforms them from simple symbols into rich illustrations. I start with a single ornament from Woodtype Ornaments 2 and then use PageMaker's circle and rectangle tools to create colored shapes behind the symbol, which show through its transparent areas. The exploded view shows how the elements are layered.



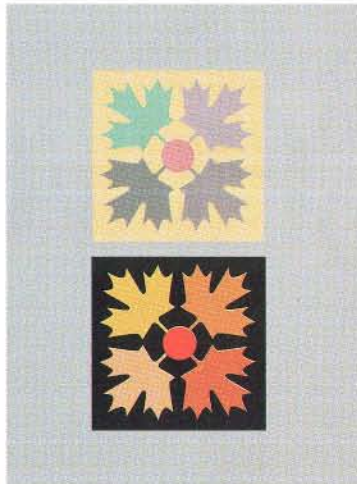
4 Scale and Overlap

You can easily resize and layer symbol fonts in a page-layout program. Using the city symbol from Carta, I create a skyline by typing five city characters in a row and making each a different type size. I color the skyline medium blue. I then make a copy of the skyline, color it dark blue, flip it on its vertical axis with the reflection tool, and place it on top of the first skyline. The dark horizontal bar at the bottom and the setting sun complete the scene.



5 Combine and Mask

Remember that in a page-layout program, fonts are treated differently from illustrations. To make this graphic element, I first color the Zapf Dingbat scissors gray and the heart red and position them so that the scissors' blades overlap the heart. Where the shorter blade touches the heart, I draw a small red patch with PageMaker's circle and line tools to cover the overlap. With the shorter blade behind the heart, it looks as if the scissors are cutting the heart.



6 Scale, Skew, and Rotate

Do some experimenting with your application's transformation tools. After duplicating a maple leaf from Carta, I apply shades of yellow, gold, orange, and red to the leaves. Each leaf is scaled, skewed, rotated, and positioned to look as if autumn leaves are falling on the ground. In a variation, the same leaf, undistorted, is copied, rotated 90 degrees around a circle, and then colored with two different palettes.



7 Create Ornamental Borders

Typing in a string of repeated symbol characters results in an ornamental border. I start with a row of leaf symbols from Zapf Dingbats, alternate the leaf symbols with bullets and add border lines, and then apply color (top three rows). Another way to create a border is to overlap rows of differently colored characters, such as half circles and arrows (fourth row). Next, I type a row of arrow symbols and tighten the letterspacing until they touch each other (fifth row). It's also possible to mirror font strings to create a symmetrical border, as with the Zapf Dingbat pointing hands and the leaf ornaments from Woodtype Ornaments 2 (bottom two rows).



This is Bob, the new employee. Whether Bob works at home or is part of your office network, PowerTalk software makes it easy for him to collaborate with colleagues—without wasting his energy on lots of complex procedures or training. Plus, PowerShare makes network expansion easy for you. So easy, you can add 200 or 2000 more Bobs by simply adding more PowerShare Collaboration Servers.

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It takes a lot of effort to physically route paper documents between different departments. With PowerTalk and Digisign software, however, people can now approve things electronically—saving time and money (and, of course, trees).

Announcing conserve energy

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With PowerTalk, sending a simple business letter is the last thing you'd expect: simple. Instead of fiddling with passwords and enclosures, just drag your letter icon onto the recipient's business card icon. PowerTalk does the rest.

It's easier than ever to stay in touch when you're on the road. Just choose who you want to send your document to, and PowerTalk takes care of passwords, phone numbers and how it gets there (fax, e-mail, etc.). So you don't have to waste your energy doing so.



In a world of immovable deadlines and shrinking bottom lines, you've got better ways to spend your energy than fiddling with passwords, enclosures and multiple interfaces. Recognizing this, the engineers at Apple created two of the most helpful networking innovations in the history of personal computing: PowerTalk™ and PowerShare™ Collaboration Servers software. With these improvements, your Macintosh® now automatically does many of the tasks you used to do manually—so you can focus on working with your colleagues, instead of focusing on getting your computers to connect. PowerTalk is the first piece of software

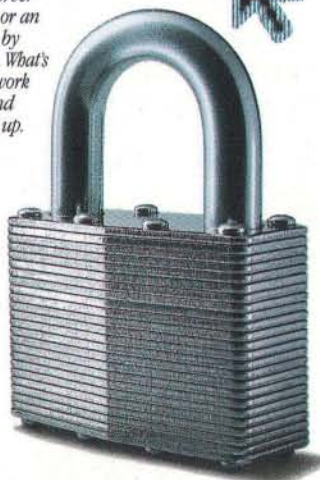


PowerTalk comes standard with System 7 Pro. PowerShare Collaboration Servers software is available separately.

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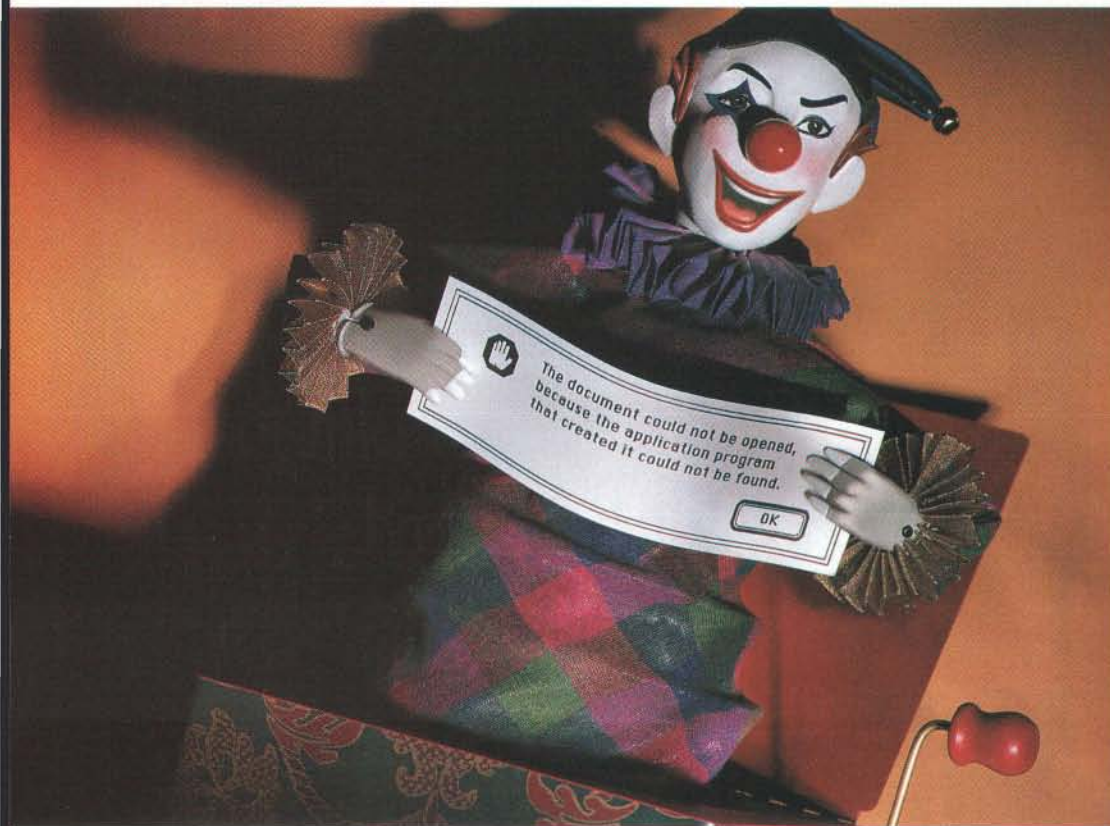
The bigger the network, the greater the need for security. That's why, to ensure total confidentiality, PowerTalk and PowerShare automatically encrypt all messages sent over your network—eliminating extra work and extra worry for everyone.

designed to make collaboration easier for individual users. Instead of bothering with separate voice mails, faxes and e-mails, all communications now reside in a single mailbox. And all messages are sent and received with the mere click of a mouse—no separate programs, no separate passwords. Plus, a catalog feature even lets people keep detailed information on their colleagues: numbers, addresses and instructions on how to send them information. PowerShare makes setting up a network equally simple. The software is easy to install and easy to maintain. Keeping track of people is easy, and adding new people is easy. To see how PowerTalk and PowerShare can help your company, call 800-732-3131, ext. 200, for the name of the authorized dealer nearest you. And discover the power that takes the work out of working together. The power of Macintosh. The power to be your best.®



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| Can View/Print PC Files | | | ✓ | ✓ | ✓† | ✓† | ✓† |
| Translates Word Processors | | | ✓ | ✓ | | | |
| Translates Graphics | | | ✓ | ✓ | | | |
| Translates Spreadsheets | | | ✓ | ✓ | | | |
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* Includes Macintosh PC Exchange. † File must be in special format; no editing capability.

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HANDS ON Bridges

ETHERNET HUBS /

PINT-SIZED PORTABLES

A 10BASE-T HUB THAT'S SMALLER than your Mac's mouse? The NetExtender (\$239), from Asanté (800-662-9686 or 408-435-8388), is easy to move from office to office, not only because it's small but also because it doesn't require a bulky power supply — it gets power from an Ethernet port (either AAUI or AUI) on a Mac or a printer. The NetExtender lets you plug as many as four Ethernet devices into a single network wall connector via RJ-45 plugs so you can build a mini Ethernet network in your own office. For instance, you can hook up a PowerBook, a printer, and another Mac to the Ethernet port of your office Mac.

You can safely plug or unplug any of the devices connected to the NetExtender without worrying about the effect on your network. In fact, turning off the host Mac or printer turns off the hub but doesn't disrupt the rest of your network. / John Rizzo



PHOTOGRAPHY / LEON



SERVERS /

APPLE FIXES APPLESHARE

FILE SERVING IS FASTER AND MORE FLEXIBLE with the latest round of AppleShare products. The new enhanced version of the Apple Workgroup Server (AWS) 95 runs 40 percent faster than last year's version, Apple claims. The AWS 95 can hold more data than before too: as many as 10 gigabytes on five 2-gigabyte internal drives (the minimum setup costs \$5,419).

Apple has improved its AppleShare software with version 4.0.1. Unlike version 4.0, the new version supports all 68040 Macs except the AVs. The update is also compatible with more Apple server software — the Apple Remote Access MultiPort Server, the Apple Internet Router 3.0.1, AppleSearch, PowerShare Collaboration Servers, and PowerTalk — so you don't need a dedicated Mac for each server-software package.

If you already own AppleShare 4.0, you can get a free 4.0.1 Tune-Up package from Apple (call 800-769-2775, ext. 7851, or download it from AppleLink or the Internet, where you'll find it in ftp.apple.com or aux.support.apple.com, in the /appleshare directory: Just type in the user name anonymous ftp). / JR

REMOTE LAN ACCESS /

GOING MULTIPROTOCOL

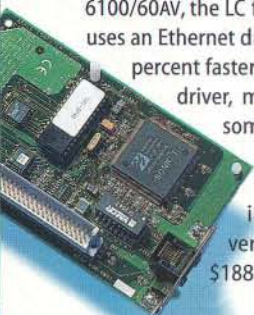
PCS AND MACS CAN USE THE SAME remote-access server if the server understands PC protocols as well as Apple Remote Access (ARA). Asanté Technologies' NetConnect Remote Access Server (8 ports, \$3,899; 16 ports, \$5,875; 8-port upgrade, \$2,175) does just that by supporting both ARA and standard IPX over Point-to-Point Protocol (PPP) for connection to Novell NetWare servers. Asynchronous modems can access the NetConnect server at transmission rates as high as 57.6 kbps.

If instead of accessing a NetWare server you need to dial in to a UNIX server from your Mac, you'll need a product such as LanRover/E 2.0 for Apple Remote Access (4 ports, \$2,499; 8 ports, \$3,499), from Shiva (617-270-8300), which lets Mac users with MacTCP use an IP application to dial in. / JR

ETHERNET /

HIGH SPEED, LOW COST

THE FASTEST ETHERNET CARD for the buck may be the Ethernet LC Twisted Pair Card (\$96 to \$103), from Apple (800-538-9696 or 408-996-1010). This PDS card for the Power Mac 6100/60, 6100/60AV, the LC family, and the Color Classic uses an Ethernet driver that Apple claims is 25 percent faster than earlier versions of the driver, making the card's Ethernet somewhat faster than built-in Ethernet on a Quadra. The card also includes a built-in 10BASE-T port. A NuBus version of the card (\$176 to \$188) is also available. / JR



LOCALTALK /

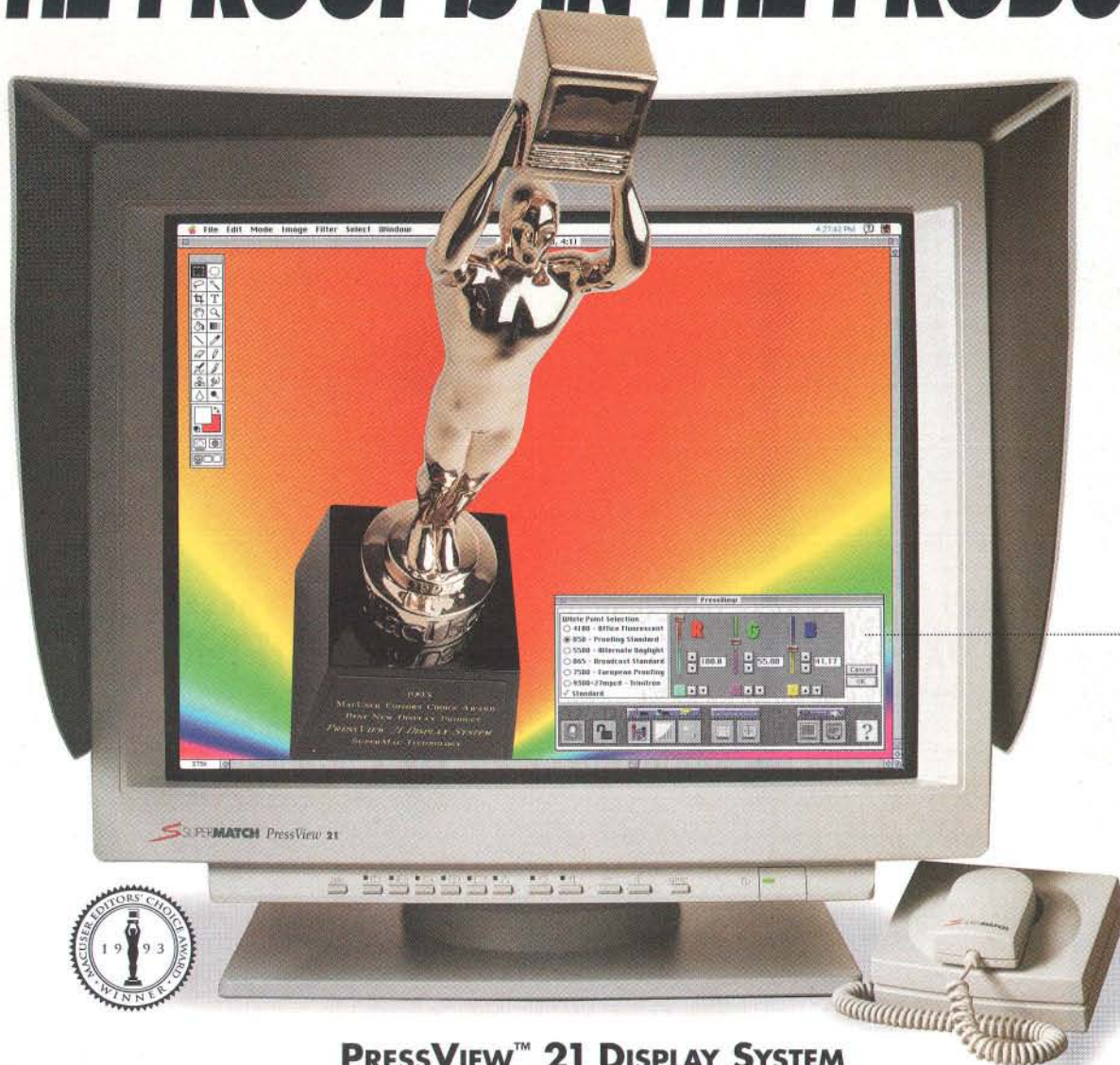
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EVERYTHING YOU NEED in order to hook up a PC to a Mac or a Mac network comes in the PCTalk/Timbuktu kit (\$379), from Apexx (800-767-4858 or 208-336-9400). The kit includes Farallon Computing's Timbuktu for Windows and PhoneNET PC software as well as Apexx's PCTalk adapter. Plugging the adapter in to your PC's parallel port gives you an instant LocalTalk connection. (Timbuktu also works with Ethernet and token ring.)

If your PC already has AppleTalk software, such as Farallon's PhoneNET PC or Miramar's MacLAN Connect, all you need is the PCTalk adapter (\$199). / JR



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The Corporate Power Mac



Apple's new Power Macs are better team players in corporate environments than any other Mac so far. Here's what to expect when you plug a Power Mac in to your network. BY JOHN RIZZO

IF GETTING A PORSCHE for the price of a Chevy seems like a good deal, I can guarantee you're going to want a Power Mac and you're going to want it *now*. But with the Power Macs' architecture being so radically different from that of 680x0 Macs, there are pragmatic questions to consider: How well do these RISC-powered Macs fit into existing networks of 680x0 Macs, PCs based on Intel chips, and RISC-based UNIX machines? Can a Power Mac be a well-connected network client? Does a Power Mac make a good server? After I looked at some prerelease Power Macs and their software — and after MacUser Labs did some testing — I concluded that the Power Macs will fit easily into today's network environments. In fact, with some additional technology to be released during the next year, the Power Macs are probably going to be the best cross-platform machines you can buy.

In addition to doing what 680x0 Macs already do, Power Macs promise two features

IS managers have wanted on the Mac for years: the ability to run DOS and Windows software at normal PC speeds and the ability to use standard PC expansion cards. The first capability is here now, with Insignia Solutions' SoftWindows, PC-emulation software that lets DOS and Windows applications run on Power Macs at the same speed as they run on a low-end 486 PC. Higher-end-486 speed and better Windows compatibility are expected by the end of the year. Around that same time, Apple will replace NuBus slots in certain Power Mac models with PCIs (Peripheral Component Interfaces); the PCI is an expansion slot created by Intel and used in newer PCs. Apple intends to offer PCI expansion cards that will work in Power Macs as well as in PCs.

Getting Connected

As network clients, the Power Macs don't differ that much from 68040 Macs. Power Macs have built-in Ethernet and LocalTalk and can use existing NuBus cards for token-

ring, FDDI, or any other networks that Macs can access today. Most Mac client software (for example, that for AppleShare, Novell's NetWare, and CE's QuickMail) and network drivers (including those for AppleTalk and MacTCP) can run in a Power Mac's 680x0-emulation mode at speeds similar to those on a midlevel 68040 Mac. One of the first network applications to be ported to native PowerPC mode should be Neon Software's network-packet analyzer, NetMinder Ethernet 3.1, which was planned for release in April. Apple and other vendors will shortly follow suit.

The advent of the PCI in the latter part of this year will be an important change for those with networked Macs. Apple plans to implement the platform-independent PCI specs to the letter, which means you'll be able to take a card out of a PC and put it into a Power Macintosh. Multiplatform expansion cards will ease the transition to new networking standards — such as 100-megabyte-per-second Ethernet — because corporate users will be able to specify a single board for use in Macs as well as PCs. Costs to users should go down, because vendors will be able to market a single card for both platforms. One of these vendors will be Apple, which will start to ship PCI versions of its Ethernet, four-port serial, and token-ring cards later this year.

Although PCI will eventually replace the NuBus standard, there's no reason to lament the passage of the latter. The PCI can handle a throughput of 155 megabytes per second, more than *three times* that of the fastest NuBus implementation in a Mac. And the PCI is not your typical PC expansion slot —

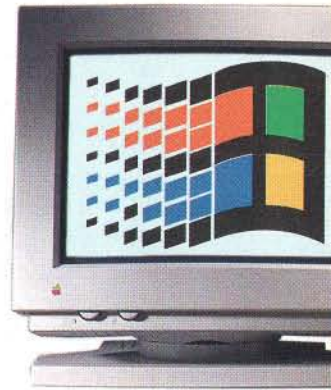
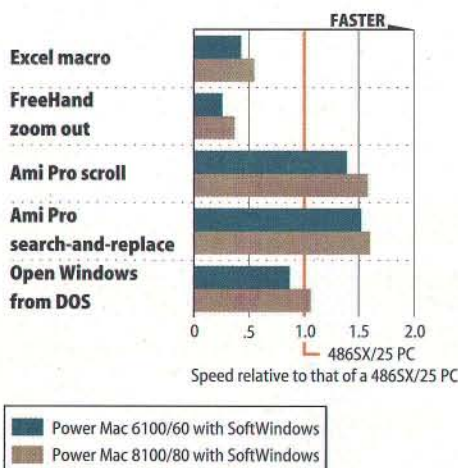


figure 1

Power Mac with SoftWindows / real PC speed



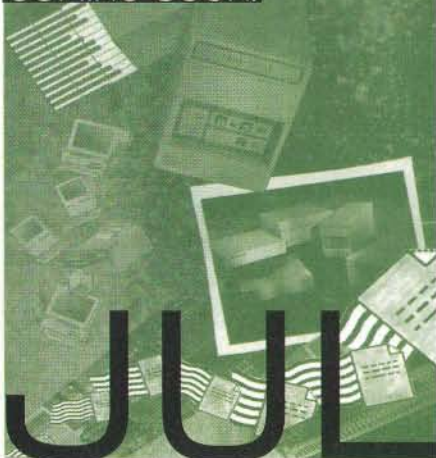
How well a Power Mac with SoftWindows performs varies with the Windows application you use

and the Power Mac model,

but it's generally similar to the performance of a low-end 486 PC. Graphic manipulations seem to be among the slower operations when Windows is running in emulation, as you can see in the results of our tests of both FreeHand for Windows, in which we zoomed out from a complex four-color graphic, and Excel for Windows, in which we ran a macro that made calculations and drew several charts.

MacUser

COMING SOON:



MAKING THE PERFECT MAC

The editors recommend ideal desktop configurations based on what you need. Whether you're using the Mac for business, home, education, DTP or Multimedia, we can suggest the baseline system — and key peripherals — that you're most likely to need. Nobody knows what buyers need like MacUser.

HARD COPY ON HARD DRIVES

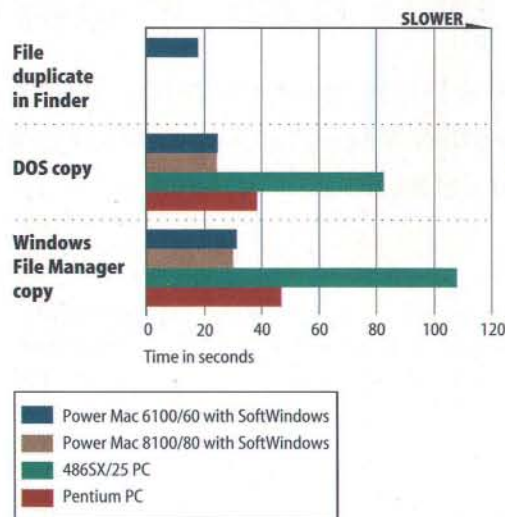
This July, MacUser tests over 30 hard drives — from 300-500 Mb — for design, quality of construction, technical support, and noise levels. SCSI Manager compatibility and performance are also tested. Plus, price-per-megabyte efficiency is detailed: 1 gigabyte drive won't cost you much more than 500 megabytes. All in the magazine that turns hard drives into easy decisions: MacUser.

LET'S POWERTALK

PowerTalk is a System 7 Pro feature giving your system an input/output box and the ability to easily send mail within documents. This article debuts MacUser's usability testing, bringing users into the Labs to evaluate every important facet of how people interface with products. The Usability Labs is just another reason why MacUser is every buyer's most important tool.

**JULY AD CLOSE:
TUESDAY,
APRIL 26TH, 1994**

figure 2 SoftWindows' Speeds / faster than a Pentium PC



File-level functions work faster under Insignia's SoftWindows on a Power Mac than they do

MacUser Labs on high-end PC hardware. Even on the low-priced Power Mac 6100/60, copying a file under SoftWindows was faster than copying it on a DEC PC based on a Pentium chip, the top-of-the-line Intel CPU.

you have no DIP switches and jumpers to set. Like the NuBus, the PCI is self-configuring and plug-and-play.

No Servers Yet

The Power Mac 8100/80 is particularly well suited for use as a server. Not only does it have a large storage capacity and impressive speed but also its two SCSI ports can be used for secure data-storage techniques such as using disk mirroring and disk arrays. Even so, you may want to hold onto your 68040 servers for a few more months.

Why? Unfortunately, not much server software currently runs on Power Macs, even in 680x0-emulation mode, and the applications that do so run somewhat more slowly than on today's 68040 servers. Although products such as CE's QuickMail server software and Apple's PowerShare Collaboration Servers do run under emulation

now, important products such as AppleShare, Apple Remote Access (ARA), and AppleSearch server software do not. Apple won't have these running in emulation mode until at least May.

Around that time, we'll also see PowerPC versions of the Apple Workgroup Servers based on the current line of Power Macs, with AppleShare running under emulation. Like today's AWS line, the PowerPC server machines are expected to be beefed-up versions of the desktop hardware, sporting larger-capacity disk drives and more RAM.

What's going to turn the Power Macs into high-speed servers is native versions of server software. One of the first native server applications will be ACI US' 4D Server 2.0, which will ship sometime this spring. Apple has not announced a shipping date for native versions of AppleShare, ARA, and AppleSearch server software, but all are

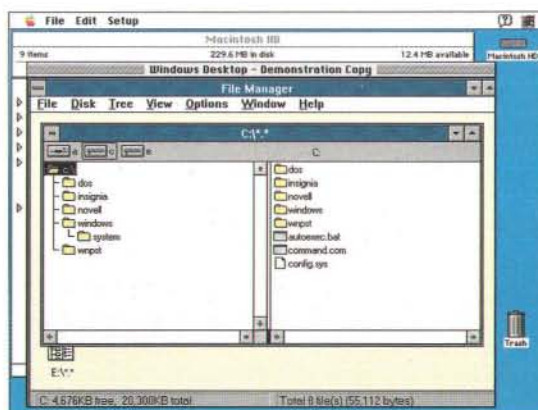


figure 3 / SoftWindows runs DOS and Windows in a window on a Power Mac, or either can fill your whole screen. Which ever way you choose, you can switch between Windows and the Finder or Windows and a Mac application as the active screen.

WANNA SEE WINDOWS SCREAM ON YOUR POWER MAC?



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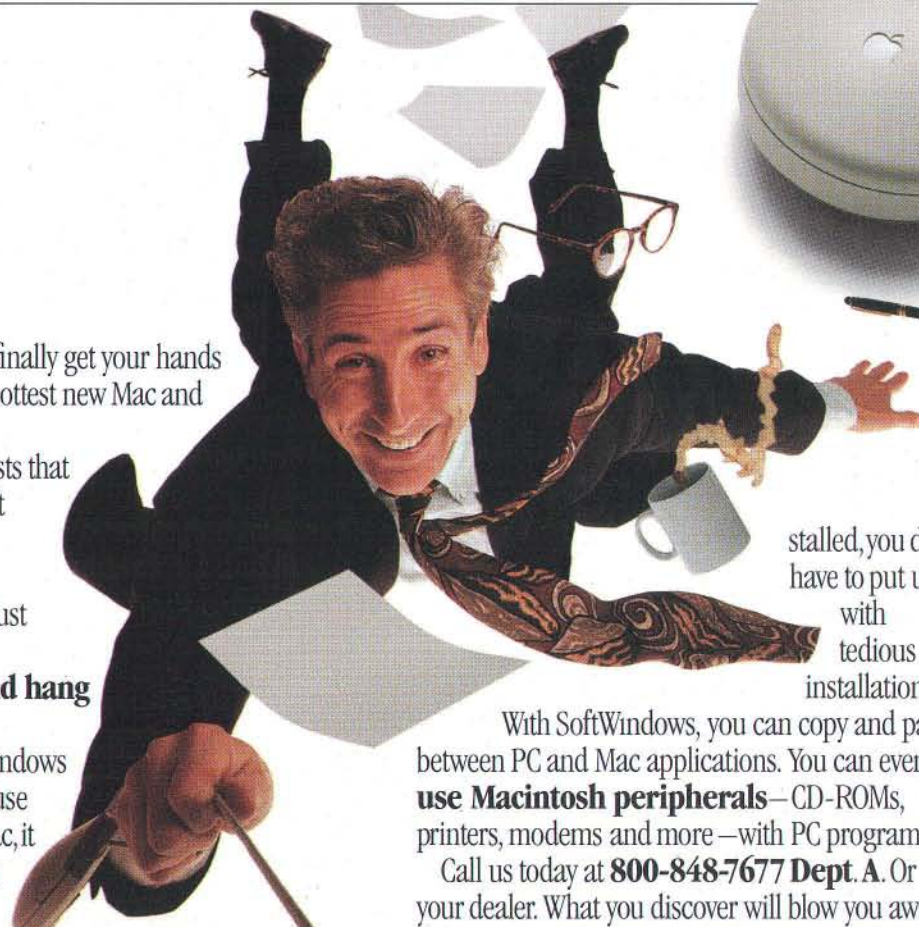
SOFT WINDOWS

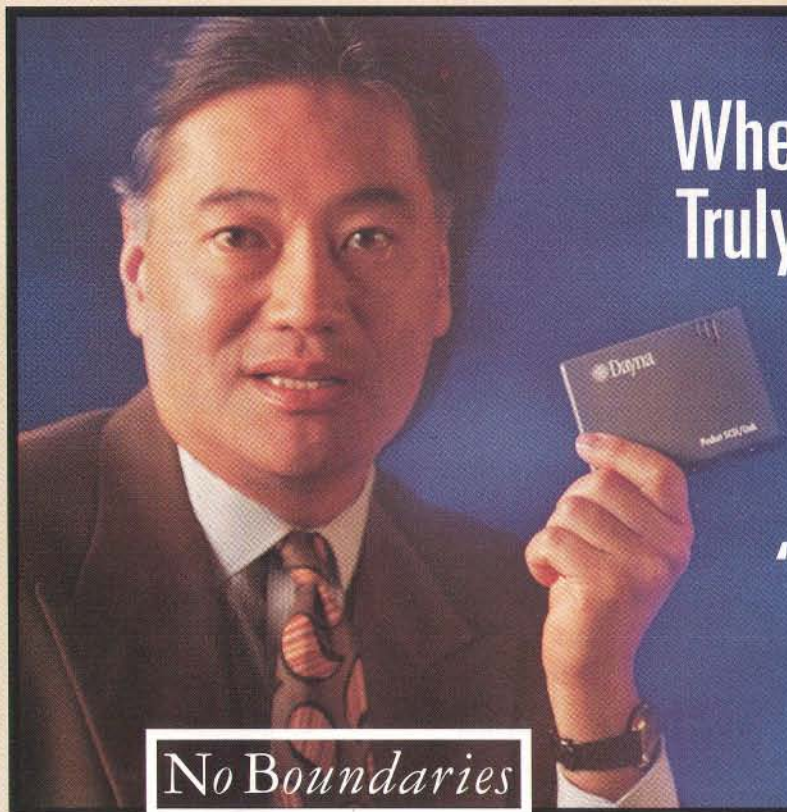
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likely to be available in less than a year.

This time frame overlaps with another development Apple has been talking about: the eventual support of DOS and Windows clients by ARA and other server software. We may be seeing the assembly of the elements necessary to create Mac-based server software that competes with PC-based server software such as NetWare: multiple services, high speed, storage redundancy, and support of PC clients.

Apple has indicated that rather than using AU/X, the operating system of the AWS 95, the Power Macs will use PowerOpen, the joint Apple/IBM UNIX version, which is based on IBM's popular AIX. Although a Mac-based competitor to NetWare is still the stuff of speculation, the Power Macs may open some doors in this area.

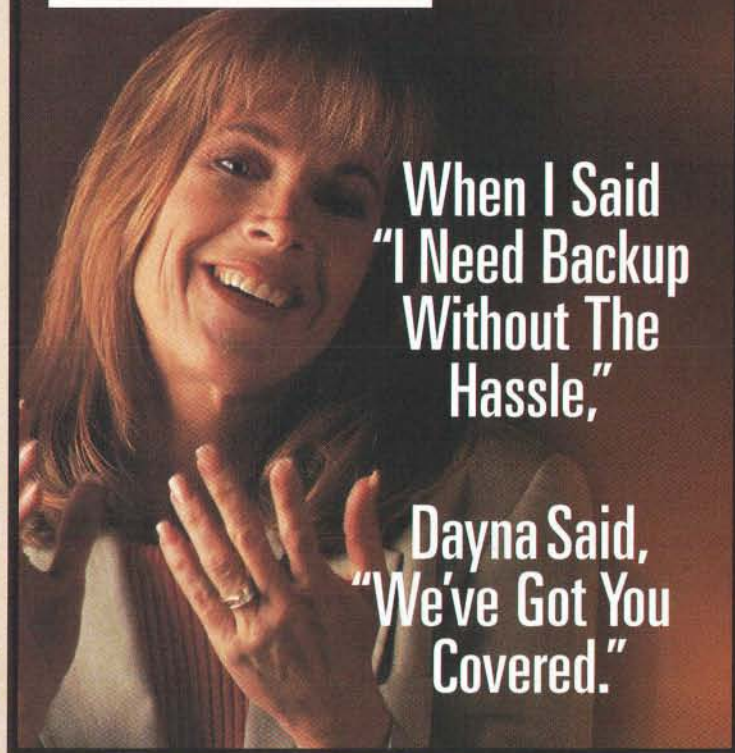
Power Macs Do Windows

In the meantime, SoftWindows will effectively integrate Macs into corporate environments, where it can be used to run Windows software on Power Macs. The two main supporters of Insignia's Windows-emulation technology are Apple and Microsoft: Apple is offering three Power Mac/SoftWindows bundles, and Microsoft is using SoftWindows to enable users to run Windows software on its Windows NT operating system. In return, Microsoft let Insignia use Windows source code in SoftWindows. It is this source code combined with the number-crunching power of the Power Macs' PowerPC 601 CPUs that makes SoftWindows much faster than its 680x0 predecessor, SoftPC.

Apple's bundles come with SoftWindows preinstalled and are available for \$2,909 for the 6100/60, \$3,859 for the 7100/66, and \$5,929 for the 8100/80 (Apple's prices as of press time). The price includes a monitor and a keyboard, 16 megabytes of RAM, and a 250-megabyte hard drive for the 6100/60 and 7100/66 and a 500-megabyte hard drive for the 8100/80. SoftWindows is also available separately from Insignia, but pricing was not available at press time.

SoftWindows on a Power Mac really makes the machine look and feel like a Windows PC, right down to the bouncing cards in Windows' Solitaire. You'll need at least the 16 megabytes of RAM Apple provides — I felt more comfortable with the 20 megabytes on the beta version of the Power Mac

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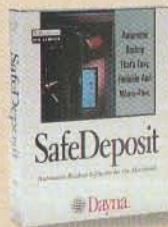


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MacUser, ★★★★★
December 1993

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on which I evaluated SoftWindows. SoftWindows makes it easy to connect your Power Mac to a PC network, because Novell's NetWare client software comes preinstalled in the Power Mac/SoftWindows bundle. SoftWindows also works with LAN Manager, TCP/IP, Windows for Workgroups, and other PC network protocols.

From within SoftWindows, you can access files stored on your Power Mac's hard disk, and you can use your Power Mac's CD-ROM drive, if you have one, to run PC CD-ROMs. SoftWindows' SmartCopy utility is a Windows/Mac Clipboard link that lets you copy and paste between Windows and Mac applications.


How fast the Power Macs ran applications under SoftWindows varied with the application and the Power Mac model — our results (see figure 1) were generally similar to those of a low-end 486, such as a PC laptop. The exceptions were DOS and Windows system operations, which were faster under SoftWindows than on actual PCs. For instance, copying files in Windows File Manager on either the 6100/60 or the 8100/80 (see figure 2) took *less time* than doing it on a high-end 486 or a Pentium PC!

The most problematic aspect of SoftWindows is that it is incompatible with some software. SoftWindows uses instructions for the 286, so DOS and Windows software that requires a 386 or later processor can't run under SoftWindows. This was true of SoftPC also, but it hasn't been a problem until recently, when some DOS and Windows software-installer programs began requiring 386 compatibility. Applications that do run under SoftWindows include Lotus 1-2-3, Ami Pro, Excel for Windows, and Microsoft's Visual Basic. Software that does not run includes current versions of Quattro Pro, Painter for Windows, ClarisWorks for Windows, and Photoshop for Windows. We found, however, that we could bypass the incompatibility problem by installing a copy of the software that was one version older than the current release.

Insignia plans to solve the incompatibility problems by introducing a SoftWindows upgrade later in the year that will use instructions for the 486. As for speed, improvements to the Power Macs, such as a 100-megahertz version of the PowerPC chip, will improve SoftWindows' speed, and a future Mac using a PowerPC 604 chip may

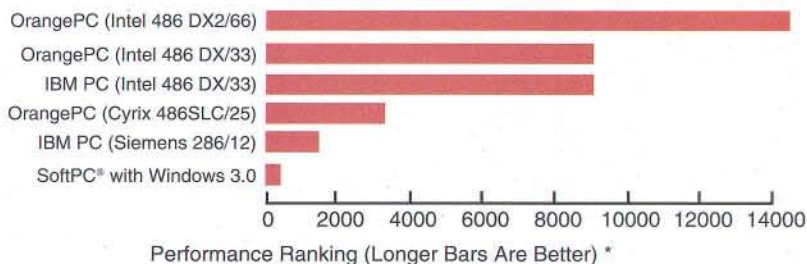
bring the average speed of a Power Mac running applications under SoftWindows up to that of a high-end 486 or beyond.

The outlook is encouraging. The Power Macs will be better corporate players than the 680x0 Macs, and with the adoption of new features such as the PCI and the availability of native server software, they are bound to be attractive options for many

corporations. SoftWindows removes the "nonstandard" stigma the Mac has had all its life and gives the Power Macs an advantage over IBM's PowerPC platforms, which can't yet run Mac software. 

MacUser technical editor John Rizzo is the author of *MacUser Guide to Connectivity* and *How Macs Work* (Ziff-Davis Press).

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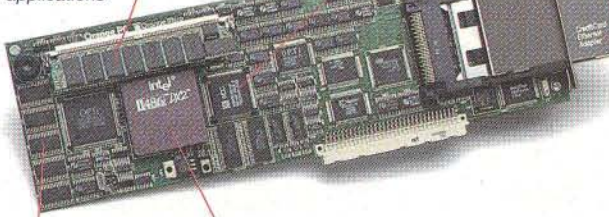
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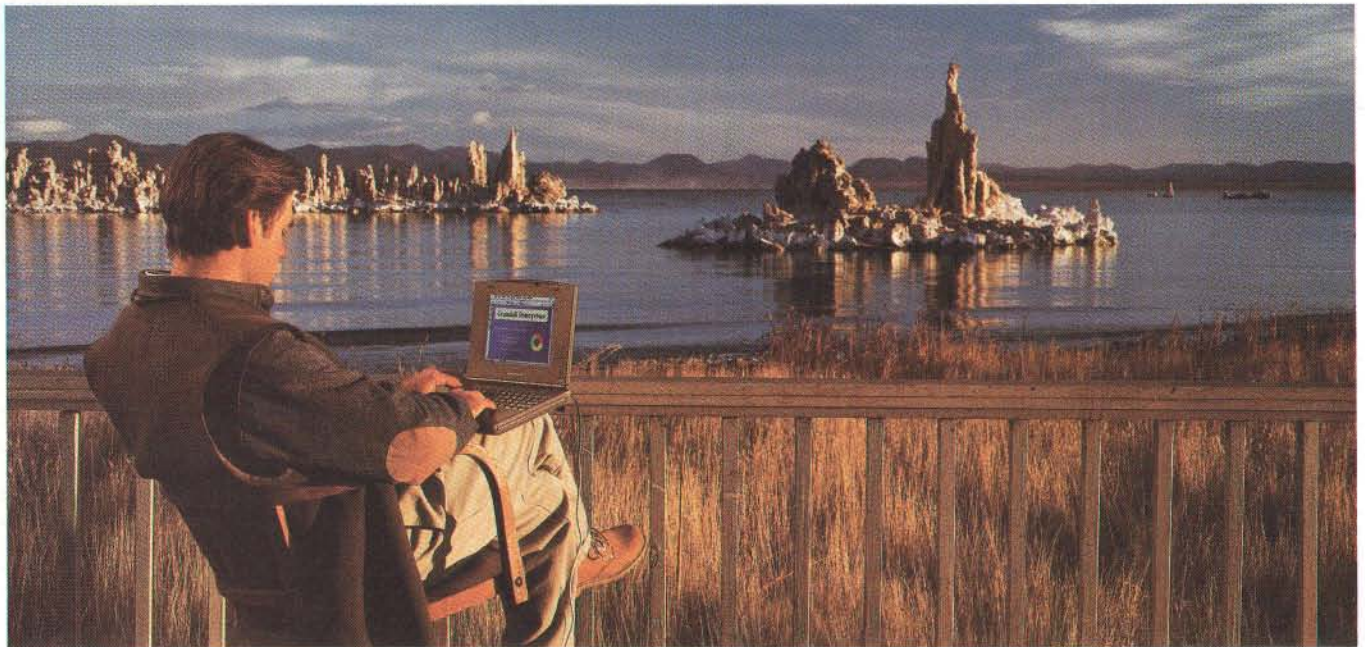
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* Benchmark results are based on the Processor Harmonic measurements from PC Bench version 7.01. SoftPC for Windows was run on a Quadra 700.
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Apple Remote Access works with System 7. Which means you work with tools you're already familiar with, such as the Chooser and Finder. And with integrated DialAssist™, you can dial in from just about any place on the planet without having to hassle with outside lines, country codes or credit card numbers.



The Apple Remote Access family of Client, Personal Server and Multiport Server products gives you the flexibility to work wherever you want, yet still have access to all your office resources.

No matter how big your organization is, there's an Apple Remote Access solution designed for you. Call 800-538-9696, extension 150, for the Apple reseller in your area. Wherever that may be.



HANDS ON

Mobile Office



PHOTOGRAPHY / LEON

MULTINATIONAL MODEM / KONEXX KOUPLER

THROUGHOUT THE REST OF THE WORLD, the RJ-11 phone plugs used in the U.S. that Americans think are "universal" don't work, which has led to frustration for many a globetrotting PowerBook user: A fax or log-on to the home office devolves quickly from mission-critical to *Mission: Impossible* if you can't hook your modem into the local phone lines.

Unlimited Systems (619-622-1400) has a solution with its Konexx Koupler Model 204 (\$149; with carrying case, tools, and accessories, \$169). It's a portable acoustic coupler that lets you connect your modem to the handsets of overseas phones, pay phones, and most cellular phones. The Konexx Koupler supports data-transmission rates as high as 14.4 kbps on electronic phone systems and 2,400 bps on U.S. pay phones. It requires no special settings and promises 30 hours of modem time from a single 9-volt alkaline battery.

Also available is the Konexx Modem Koupler Model 305 (\$299), which combines the acoustic coupler with a built-in 2,400-bps (data)/9,600-bps (fax) modem. / Jim Shatz-Akin

PAGING ALL NEWTONS / APPLE WIRELESS MESSAGING SERVICE

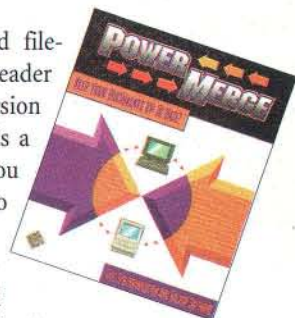
TAKING A CUE from paging services that supply pagers to their subscribers, Apple's Personal Interactive Electronics Division and MobileComm have teamed up to offer the Apple Wireless Messaging Service: a

Newton MessagePad with a Newton Messaging Card for lease. Priced at \$49.95 per month (provided you sign a 24-month lease contract), you get the hardware plus local pager coverage; nationwide coverage costs an additional \$20 per month. This service includes as many as 125 text messages per month as well as four news briefs per day. For more information (within the U.S. only), call 800-474-6374. / Stephan Somogyi

POWERBOOK UTILITIES / NEW, UPGRADED, AND GONE

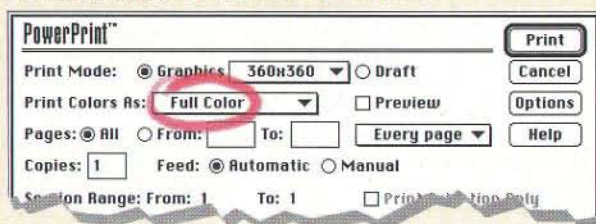
THERE'S NO SHORTAGE of PowerBook utility packages these days. No sooner had Symantec announced that it would stop production of Norton Essentials for the PowerBook than ASD (909-624-2594) started touting its new Wiz Tools for PowerBook package. For \$99.95, you get security software, automatic remote connection to networks, file synchronization, battery-level and disk-activity indicators, and other goodies designed to make PowerBooking a little easier. Frequent travelers (or anyone who makes a lot of overseas phone calls) will like the WorldClock feature, which adds a pop-up clock to your menu bar that tells you the time and date in any countries you select.

For those who want a high-powered file-syncing package, PowerMerge, from Leader Technologies (714-757-1787), is now in version 2.0. Priced at \$129, the new version adds a document-comparison feature that lets you compare two text documents line by line to make sure you're updating the correct version. PowerMerge also lets you rename documents from within the program and locate all duplicate files. Interestingly, Leader is promoting PowerMerge as an easy-to-use basic backup program too. / Victoria von Biel



MAKING CONNECTIONS / COLOR PRINTING

You don't have to worry about finding a compatible color printer when you're traveling with your PowerBook, if you have PowerPrint 2.5 (\$149; upgrade only, \$30), from GDT Softworks (800-663-6222 or 604-291-9121). This serial-to-parallel adapter cable and new driver software support 32-bit color, so you can take advantage of low-cost color printers for PCs and of printers that print millions of colors. You can also use specialty printers, such as those with wide carriages. The software gives you the usual printing controls, such as reduction, enlargement, inversion, horizontal and vertical flips, and landscape printing. / Nancy Peterson



Just Click and Double Your RAM

| About This Macintosh | |
|----------------------|--------|
| Macintosh Quadra 650 | |
| Total Memory : | 5,120K |
| System Software | 1,187K |

Before RAM Doubler

RAM Doubler doubles your RAM without expensive hardware or complicated installation. It's worry-free from the start.

RAM Doubler™ gives your Mac twice as much memory to open applications. You'll be rid of "Out of Memory" messages forever.

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- United States Patent Number 5,063,499. Other patents pending.
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The best thing about RAM Doubler is that it's easy to use. Just click to double your RAM. It's that fast. It's just that easy.

This package includes the one-step installer for the RAM Doubler software and an easy-to-use manual. Nothing else is required.

It's never been easier or more affordable to add memory to your Mac.

| About This Macintosh | |
|----------------------|---------|
| Macintosh Quadra 650 | |
| Built-in Memory : | 5,120K |
| Total Memory : | 10,240K |
| System Software | 1,187K |

After RAM Doubler

RAM Doubler is the latest from Connectix, the Macintosh memory experts and the makers of award-winning products such as CPU - Connectix PowerBook Utilities, CDU - Connectix Desktop Utilities, Virtual, MAXIMA and MODE32.

| | | |
|----------------------|--------|------------|
| Adobe Illustrator... | 2,000K | ██████████ |
| Adobe Photoshop... | 2,048K | ██████████ |
| Microsoft Excel | 2,000K | ██████████ |
| Microsoft Word | 2,048K | ██████████ |
| PageMaker | 2,048K | ██████████ |
| QuarkXPress | 2,048K | ██████████ |
| System Software | 2,083K | ██████████ |

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CIRCLE 62 ON READER SERVICE CARD

PowerBook Tips

From replacing corrupted files to taming the power adapter, these tips from experienced PowerBook users will keep you on the move. **BY JOSEPH O. HOLMES**

File Sharing

Here is a quick way to tell when file sharing is on after you wake up or restart your PowerBook: Leave a shared folder on your desktop. (You can share an empty folder if you want, but an alias or a folder with a customized icon won't work.) A quick look at the bar on the folder's icon will tell you that file sharing is on.

Chris Holmes
Berkeley, CA

Monitors Control Panel

If you use an external monitor with your PowerBook, you can select it as your main monitor by dragging the menu bar from the built-in monitor's icon in the Monitors control panel to the external monitor's icon. Unfortunately, some applications, especially some games, don't check for the menu-bar location and still appear only on the built-in monitor. The same is true for startup screens.

To fix this, hold down the Option key while your Monitors control panel is open.

Write to PowerBook Tips

c/o MacUser
950 Tower Lane
18th Floor
Foster City, CA 94404

You can also send your tip to Joseph Holmes (72241,731) on ZiffNet/Mac, MacUser's on-line service. We pay \$25 for every undocumented tip we print, and the Tip of the Month earns \$100; see page 4 for more details.

You'll see a smiling little Mac pop up on your icon of the built-in monitor. Drag the little Mac to the icon of the external monitor. Your games and startup screen image will now display correctly on the external monitor. When you're on the road again, everything automatically reappears on your built-in monitor.

George Pytlik
Vancouver, BC, Canada

AC Adapter

The PowerBook's AC adapter is difficult to pack — its sharp prongs can tear through even PowerBook cases made of tough nylon.

An inexpensive three-prong adapter will cover up those prongs so they are not so dangerous. Just twist off the inexpensive adapter's prongs with a pair of pliers, and fit this adapter over the PowerBook adapter's prongs.

Del Holmes
Muncy, PA

Quieter PowerBooks

You can silence the startup sound of a PowerBook 100, 140, 145, or 170 by inserting a headphone plug into the audio-output port. You don't need headphones — just pick up a mini phone plug from an electronics-supply store.

Richard Hart
Alpena, MI

[You can turn off the startup chime on other PowerBooks by using the lowest setting in the Sound control panel. — Ed.]

A Smaller CIM

If you use CompuServe Information Manager (CIM) on a low-capacity PowerBook hard disk, throw out the file called CIM Data, and you'll save anywhere from 270K to 320K of space. This file contains color resources

TIP OF THE MONTH

Spare System Folder

Here's one way to fix a corrupted System file while you're on the road:

Use a compression utility to compress a freshly installed version of the System and Finder files, and keep them on your PowerBook hard disk.

Should there be any indication that your system is corrupted (frequent crashes, for example), drag the currently installed System and Finder files from your System Folder to the Trash (don't empty it), expand the compressed System and Finder files, place them in the System Folder, and restart. You can then empty the Trash.

Neil Van Ess
Chester, PA

for the splash screen, color icons, and other information. Download the black-and-white CIM Data file from ZiffNet/Mac's Download & Support Forum (ZMLITE.BIN, in Library 5), and you'll have black-and-white icons in your Browse window for only an additional 6K.

Kevin Norris
San Francisco, CA

AppleTalk Networks

If you're continually disconnecting your PowerBook from and reconnecting it to an AppleTalk network, switch AppleTalk off and reboot when you leave the network. If you just switch AppleTalk off and keep on working, AppleTalk continues to take up a great deal of RAM. You can turn off AppleTalk in the Chooser, but I use ToggleAT (available as TOGATA.CPT, in Library 3 of ZiffNet/Mac's Download & Support Forum), which lets you turn AppleTalk on and off without opening the Chooser.

William Gallagher
London, England

[Some commercial PowerBook utilities, such as Billy Steinberg's PBTools and Connectix's CPU, also let you turn AppleTalk on or off without opening the Chooser. — Ed.]



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DISPLAY PRODUCTS

In Case of Emergency . . .



Crashing systems, recalcitrant hard drives, and erratic applications are a problem anywhere, but fixing them on the road means planning ahead — and carrying some tools with you. BY SHARON ZARDETTO AKER

ARE YOU PREPARED for emergencies on the road? And what should you pack, just in case?

I recently took a four-day semivacation. You know the kind — you squeeze in a few hours of work each day while the Caribbean waves visible from the hotel-room window do their best to distract you. For the first time in two years of PowerBook schlepping, I decided to live dangerously. All I packed was my PowerBook and an AC adapter. No system disks. No emergency disk. No backups. I figured that if something went wrong with the PowerBook, it would mean that I was fated to take a *real* vacation.

But if you're away for a week or so and you have critical work to do, you can't be quite so cavalier. Without your computer in working order and your files available, you'll be up the old creek without a PowerBook.

All Systems No Go

You should start by packing a full set of system disks. What you're most likely to run into is the inability to start up or unpredictable crashing that nothing but a reinstallation of the system software will cure. Don't forget that in addition to the basic system disks, you will also need the appropriate

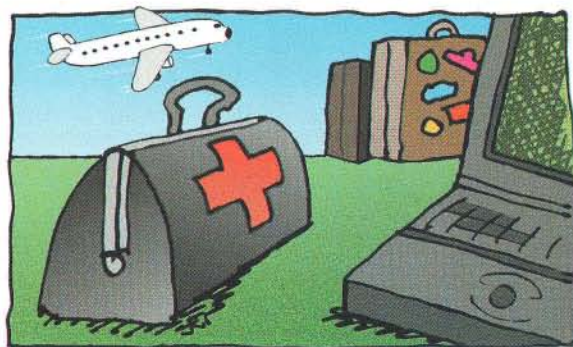
System Enabler file.

You'll be carrying six to eight disks for such an emergency situation. And if your PowerBook doesn't have a built-in floppy drive, you'll need to bring one of those along too.

For solving system-software problems, there are two alternatives that let you leave that pile of floppies at home. Each method works for a lot of people, but I mention them with reservations — which is to say I wouldn't bet my *job* on having them work in a crunch.

The first alternative is to use a compression utility to make a condensed copy of your System Folder. Also make yourself a startup disk containing a minimal system, using the Apple Installer. Start up by using the startup disk, and then expand the compressed System Folder. The risk here is that the problem that led to the system corruption may be lurking in your copy of the System Folder too. Make sure you compress a *fresh* copy of the System Folder, not the one with all the iffy extensions and control panels you add the day before you leave home.

The second alternative is to create two partitions of your hard disk and keep a clean



System Folder on the smaller partition. If the PowerBook can't boot from the main partition, it will automatically switch to the other one. With the second partition running the show, you can see the main partition and get to your work, run some disk-diagnostic software, or replace the system files. (By the way, the Mac mounts the partitions in alphabetical order, so name them accordingly. The Startup Disk control panel shows the partitions as separate disks, but because both the partitions share the same SCSI ID number, you can't set one of them to start up out of alphabetical order.)

Emergency First Aid

Right up there with corrupted system software, vying for first place in the Problem Most Likely to Happen on the Road contest,

POWERBOOK SECRETS / new Duo batteries

THE POWERBOOK DUO 250 and 270c each come with a high-capacity NiMH (nickel metal hydride) battery that provides 50 percent longer battery life than the older Duo battery and can be recharged in as little as three hours.

The good news is that this Type 2 battery works nicely in the older-model Duos (the 210 and the 230) as long as you install the latest PowerBook Duo Enabler software; otherwise, you'll find that the battery's performance isn't even as good as the Type 1's. The only way to get the Enabler software is from system software, which comes with a new Duo, or with a new

battery. If you order a Type 2 battery (using order number M1835LLA) from your dealer, you'll get a disk with the new Enabler file and four updated control panels (PowerBook, PowerBook Setup, PowerBook Display, and AutoRemounter). If, however, your dealer orders the battery as a service part (order number 661-1735), you won't get the software.

You can identify a Type 2 battery in three ways: Its battery-release button is smaller than the one on the earlier battery; it doesn't have that useless little battery-charge switch; and the label reads M1499, High Capacity Type 2.

/ Rich Wolfson



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Supra Corporation

| PRODUCT | MAC | DESCRIPTION |
|---------------------|----------|---|
| SupraFAXModem PLUS | \$149.95 | External 2400 bps data & 9600 bps fax |
| SupraFAXModem 144LC | \$189.95 | External, low-cost 14,400 bps data & fax |
| SupraFAXModem 144PB | \$269.95 | Internal 14,400 bps data & fax for PowerBooks |

| PRODUCT | MAC | DESCRIPTION |
|-----------------------|----------|--|
| SupraFAXModem V.32bis | \$249.95 | External 14,400 bps data & fax with display |
| SupraFAXModem 288PB | \$399.95 | Internal 28,800 bps data & 14,400 bps fax for PowerBooks™ |
| SupraFAXModem 288 | \$399.95 | Top-of-the-line, external 28,800 bps data & 14,400 bps fax |

is a hard disk that refuses to mount, no matter what you try. Or you may have other disk-based problems, and rebuilding the desktop isn't helping and Disk First Aid (right there on your system disks) tells you there's a problem it can't fix.

Whether you swear by Symantec's Norton Utilities for Macintosh, Symantec's Public Utilities, or Central Point's MacTools (my favorite), *always* travel with emergency startup and disk-repair disks. Test the startup disk before you leave home, making sure it actually starts your computer. Don't join the club of panicked and frustrated PowerBook users who run into a disk problem on the road and call to order a disk-repair package to be shipped overnight to whatever hotel they're in. You'll find there's no such thing as a generic startup disk for your PowerBook in any of these packages; you have to make your own, because you need the correct System Enabler file for your PowerBook.

Applications and Files

How are you going to write that report, or crunch those numbers, or log on to your remote network if your main application decides to quit repeatedly for unknown reasons? It's not necessary to bring a set of master disks for reinstalling the whole application; it's seldom an application's support files that are causing the problem (except perhaps for the Preferences file, which you should trash at the first sign of weird problems with any application — especially Word). All you need is the application itself. Most applications fit on a floppy; compress them, and you can fit two or three on a disk. And speaking of compression, if room on your hard disk isn't at a premium, keeping compressed copies of the applications in a folder (with a name such as In Case of Emergency, Break Glass) cuts down the floppy stack.

If your system's covered and your applications are restorable, you might think you're set. Think again. What are you working on? How long will it take you to start again from scratch if the file is corrupted? Bring a backup of your important files, and back them up continually as you work. Keep three copies around — a spare on the hard disk in case the first copy is corrupted and another on a floppy in case the whole PowerBook goes down — you might be lucky enough to

find another Macintosh to work on.

Here's a tried-and-true method for keeping copies of those important files available: E-mail the documents to yourself before you leave. If you need them, you can download them. Or you can make a set of backup disks, packaged and ready to be shipped to you at your remote location; leave them with a colleague or friend who can send them to you overnight if necessary.

Hard-Luck Hardware Stories

So far, we've considered only software emergencies. What about hardware? If you don't do hardware fixes at your home base, you're not likely to do them on the road either. But if you're used to opening your PowerBook (damn the warranty, full speed ahead), you should prepare yourself for some on-the-road fixes too: Cables and memory modules can come loose with all that jostling during travel. What tools you need depends on some extent on your PowerBook model. In general, you should pack an antistatic wrist strap and screwdrivers: Torx #8 and #10 for all-in-one PowerBooks, a T8 for a Duo, and a Phillips for a 100. If you think the idea of packing a tool kit is too far-fetched, I refer you to my colleagues Rich Wolfson and Don Crabb. Don had some RAM installed while visiting a trade show in San Francisco earlier this year and, late that very same night, ended up with a dead PowerBook, due to a bad memory module. If Rich hadn't been in the habit of carrying around all sorts of tools "just in case," Don would have missed a crucial deadline.

When it's a hardware problem you can't fix yourself, don't panic. The folks at Apple SOS are only a phone call away (800-767-2775 within the U.S.); you can ship the PowerBook to them from any location, and they'll ship it back.

Living Dangerously

So what happened to my PowerBook on my vacation? It broke. A faulty motherboard made the keyboard work first erratically and then not at all. I couldn't have fixed it even if I *had* packed everything! I came home with a useless PowerBook and a sun-tan. It was great. ☹

Sharon Zardetto Aker is the coauthor with Richard Wolfson of the second edition of *The PowerBook Companion*.

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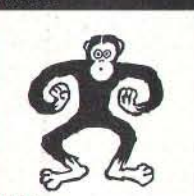
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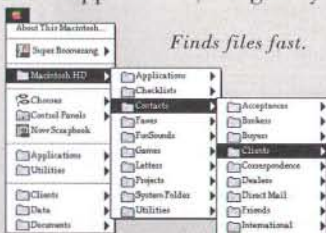
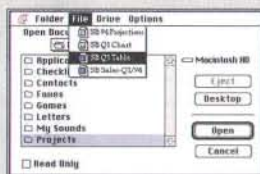
THAT IS, IF THEY WEREN'T STILL SPEECHLESS.

Now Utilities has won so many top awards lately, the critics almost seem awestruck. But when they do speak, you'll find their comments echo those of author/consultant Bob LeVitus, who calls Now Utilities "a must have for any serious System 7 user." Why all the fanfare? Because Now Utilities

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HANDS ON Power Tools



PHOTOGRAPHY / LEON

V. Fast Modems

SUPERFAST MODEMS ARE HERE at last, which is great news for anyone doing remote computing. BY STEPHEN SATCHELL AND VICTORIA VON BIEL

Want an inexpensive, superfast modem? Take your pick: There are V.fast, V.FC, V.32terbo, and soon V.34 models, all crowding the shelves of your local superstore.

Confused? You're not alone. During the past year, a dizzying array of modem technologies has appeared in anticipation of the release of modems based on the V.34 (also called V.fast) protocol, which will send data hurtling across phone lines at a top speed of 28.8 kbps (kilobits per second). Although the specs for V.34 have been available for a while, *official* recognition of the guidelines isn't expected until June, meaning that products that use the official specs won't be

in the stores until this fall. Late last year, however, Rockwell International released the V.fast class, or V.FC, chip set, which implements a proprietary version of draft V.34 specs (V.FC modems aren't fully compatible with V.34 modems, but the two types of modems can communicate with each other at speeds lower than 28.8 kbps). Four companies (Hayes Microcomputer Products, Microcom, Supra, and Zoom Telephonics) started offering products incorporating V.FC chips for sale early this year. These companies will probably deliver V.FC-to-V.34 upgrades in the \$50-to-\$100 price range when new products become available after official recognition of the V.34 specs.

Just to make things even more confusing, V.32terbo, which is capable of a 19.2-kbps data-transfer rate, employs technology developed by AT&T that is not based on the V.34 specs. The Global Village Mercury line of modems uses V.32terbo chips. V.32terbo modems are not compatible with either V.34 or V.FC ones but, again, can communicate with these modems at speeds slower than 19.2 kbps.

Who Needs V. Fast?

Should you rush out and buy one of these new modems? Maybe. If you use your modem mainly to access an on-line service and you already have a V.32 modem (capable of 9,600 bps)

or a faster one, you don't need to upgrade — yet. But if you're a PowerBook user who does a lot of remote computing or if you use Farallon's Timbuktu Remote or Apple Remote Access, a V.34 modem is going to make your telecommuting life a *lot* easier. Unfortunately, *internal* V.34 PowerBook modems will draw too much power to be used on battery power alone. For best performance, Supra recommends that its SupraFAX-Modem 288PB V.FC modem be used when the PowerBook is plugged in.

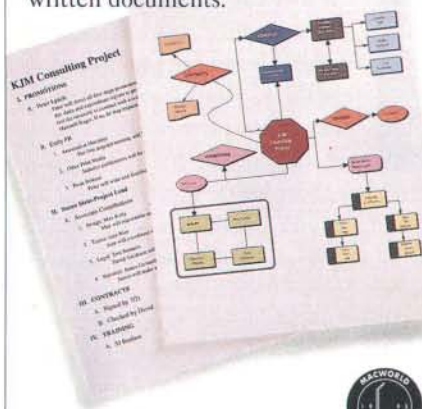
Another area in which V.34 modems will be valuable is in connecting two or more local-area networks. Their high speed will make LAN-to-LAN or remote-computer-to-LAN connections a lot more efficient. With V.42bis data compression, for example, you can transfer a bit-mapped graphic at an effective rate of 200 kbps over a 28.8-kbps connection, a rate an Ethernet or token-ring network can easily support.

If you're expecting V.34 modems to be expensive, then you're in for a pleasant surprise. Unlike V.32bis modems, whose prices started at \$1,500 and then gradually came down as their technology was more widely adopted, V.34 modems are going to have prices that start low and stay stable, with

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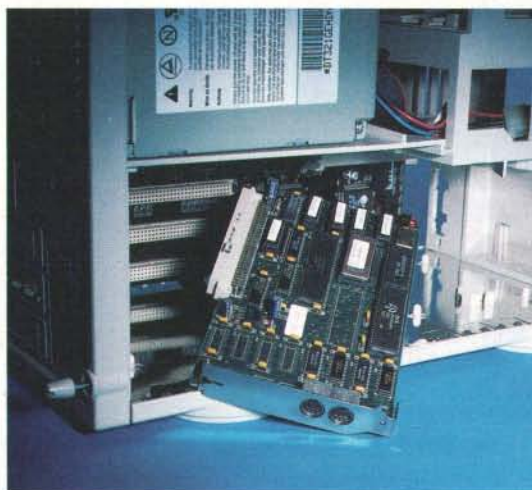


figure 1 / A little too fast for your Mac? The Mac's serial manager limits how fast your computer can communicate with a V.34 modem. You can get around this bottleneck with Creative Solutions' NuBus Hustler High Speed Serial board, which adds one serial port capable of data transfer at 230.4 kbps or two serial ports capable of 115.2 kbps.

consumer-grade modems costing \$400 and up and industrial-grade products costing \$700 and up.

Phony Lines

The news isn't all good, however. V.fast technology is proving to be a very sensitive test of phone-service quality. Many standard telephone-industry practices (pair gain, subscriber-loop loading, and continued use of older central-office subscriber-interface cards, for example) will keep you from attaining full speed. The bottlenecks are in your local phone exchange. Even though a long-distance network will support V.34 at full speed, it's what's between your modem and the first digital switch that will slow you down.

There's not much you can do to remove this bottleneck, short of complaining to your local phone company. Among your other options are to have your inside wiring

checked by an electrician to make sure it's up-to-date and to install a digital connection (a T-1 link) between the phone company and your company's phone switch.

To compensate for poor-quality phone lines, V.34 was designed to examine every single connection and adjust the modem's equalizers and signal converter to get the fastest possible data transmission. From their top speed of 28.8 kbps, V.34 modems can step down in 2.4-kbps increments, just as V.32bis modems can, so that each fallback position slows the data-transfer rate down just a little bit, rather than cutting it in half as V.32 and older protocols do.

So why won't a V.34 modem speed up file-download from an on-line service? The packet-switched networks on-line services use don't have enough bandwidth to handle V.32bis communications, let alone V.34. What's more, the computers used by on-line services have enough problems keeping up

V. WHAT? / a guide to modem-technology names

COULD MODEM-PROTOCOL LABELS be any more complicated? We think not. You won't be surprised to learn that all these names are thought up by a bunch of techno-bureaucrats. In the meantime, here's a quick guide to what the names in the current crop signify:

V.34, V.fast, V.FC. Rather than wait for the official guidelines for V.34 to be ratified (which happens this summer), a few modem manufacturers have jumped the gun and released modems that use V.FC (fast class) chips. These modems are virtually the same as — but aren't fully compatible with — V.34 modems. Another name for V.34 is V.fast, which was the interim (and unofficial) name of V.34 during its development. All these modems are capable of a top speed of 28.8 kbps.

V.32terbo. Also unwilling to wait for final ratification of the V.34 specs, AT&T went ahead and developed V.32terbo technology, which allows data-transfer rates as high as 19.2 kbps. (By the way, V.32terbo is a play on words. This protocol comes after V.32bis; *bis* means *second* in French, and *ter* signifies *third*.) V.32terbo modems are not compatible with V.34, but that's not a big deal. For many people, V.32terbo speed is plenty fast enough, and you can still connect to V.34 modems at 14.4 kbps.

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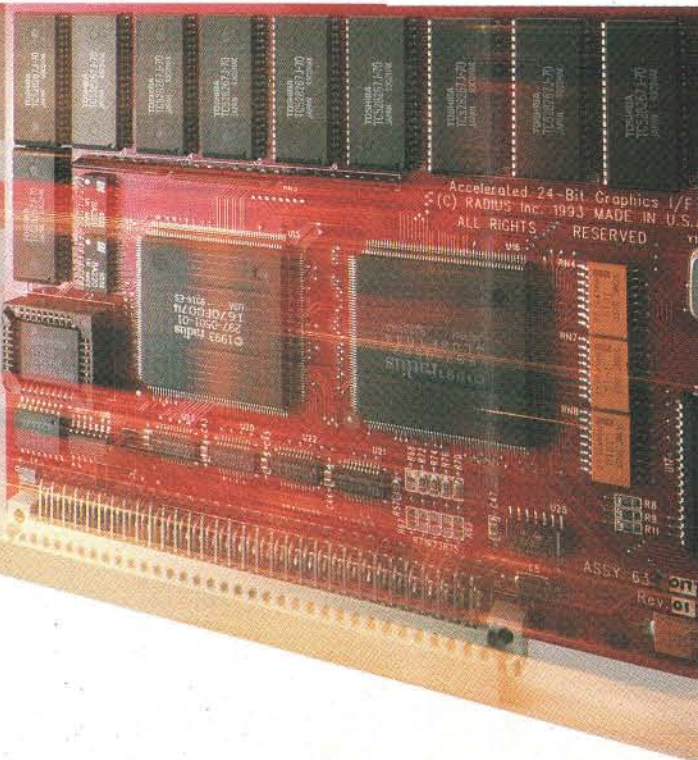
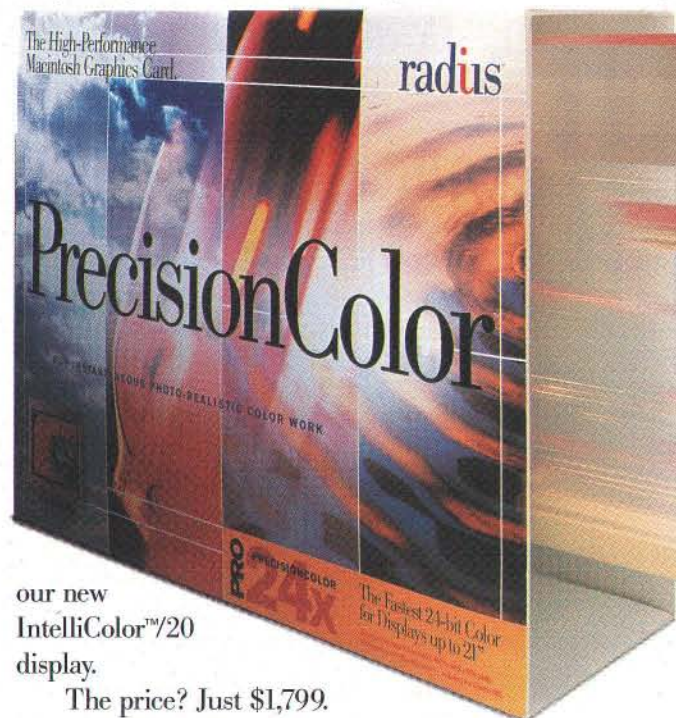
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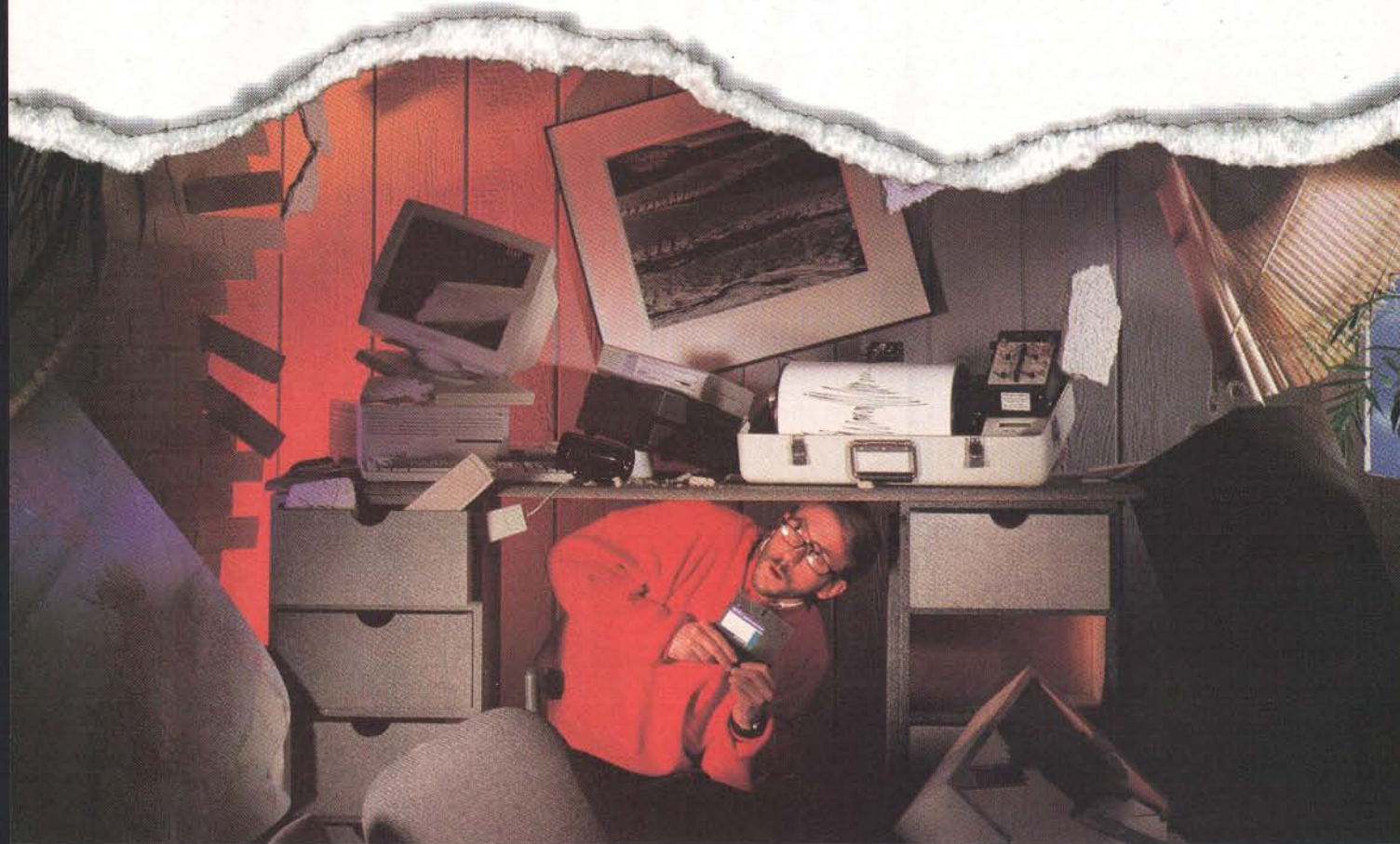
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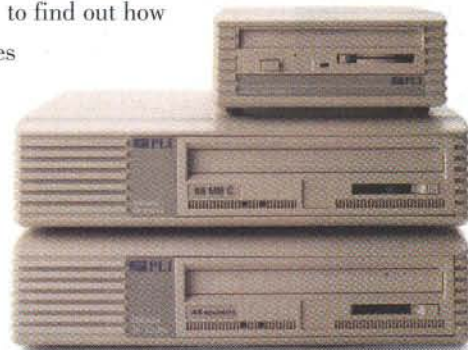
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with 9,600-bps connections. So even if your on-line service could communicate at 28.8 kbps, it's unlikely that the service would be able to handle the data load fast enough to take full advantage of the speed the connection offers.

All Correct

A unique feature of V.34 modems is that they test the telephone channel at the start of each call for defects that they can either correct or take into consideration when they select a transmission speed. Because V.34 modems can work at so many different speeds, you'll need to make sure your modem is set up to use V.42 error control. When you're transferring text, V.42bis compression can take data-transfer rates beyond what the Mac's serial port can handle. In such a case, any slowdowns are due to your Mac's physical limitations, not the modem's.

You can speed up how fast your Mac and modem communicate, by installing in your Mac the \$329 NuBus Hustler High Speed Serial board, from Creative Solutions (800-367-8465 or 301-984-0262). This board adds one serial port capable of 230.4-kbps data transfer or two serial ports capable of 115.2-kbps data transfer (see figure 1). The included software provides Apple Communications Toolbox support, which enables Toolbox-compatible communications software to access *any* serial port, not just the Mac's modem and printer ports. By the time you read this, some modem manufacturers may be bundling Hustler boards with V.34 modems.

Whether you have a Hustler or not, your Mac's serial port, unlike that of a PC, will be compatible with any V.34 modem. It doesn't matter whether the modem uses EIA-530, V.34, or RS-449 connectors — your Mac is already V.34-ready.

That so many companies have come out with V.34-type products even before the official guidelines have been released is good news for modem buyers. The pressure is now on all modem vendors, not just the early birds, to bring out reasonably priced products as quickly as possible after the guidelines are cast in concrete. 

Stephen Satchell is a consultant and author of *Satchell Evaluations Public Telecom Letter*. Victoria von Biel is a *MacUser* senior editor.

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Tip Sheet

A tip you should know before you clean the glass on your monitor and one of the easiest ways to create a slide show. BY PHILIP RUSSELL

IN MICROSOFT WORD 4.0 AND LATER, if you double-click on the numbers or a margin marker (one of the small black triangles) in the ruler, the Paragraph dialog box will appear on-screen.


IF YOU PLACE TEXT from one document in PageMaker (version 4.0 or later) into another, you have the option of placing all the text or just individual text blocks, or stories. To help you choose, PageMaker displays the

first few words of each story during the placing process. You simply Shift-click on those words for the stories you want to place.

TO NAVIGATE QUICKLY through the hierarchy of folders in Open and Save dialog boxes, click on the disk icon next to the disk name on the right side of the dialog box. Each click takes you closer to the root volumes on the desktop.

COMMERCIAL GLASS CLEANERS can ruin your monitor's screen, by removing the antiglare coating, and flammable glass cleaners can be hazardous if there's static electricity. It's safest to use distilled water or a vendor-supplied cleaner.

THE DESKPAINT MODULE of DeskPaint & DeskDraw, from Zedcor (800-482-4567 or 602-881-8101), provides a simple way to view clip art or even create a slide show inexpensively. To view images in quick succession, start on the desktop. Put the clip art or

graphic images you want to view into one folder. Open DeskPaint, select Browse from the File menu, navigate through the folders in the Browse dialog box until you find the folder with your graphic images, select the image you want to start with, and click on the Browse button. The images will appear one at a time on-screen. You can control how quickly the images appear by pressing the 0 through 9 keys on your keyboard, 0 being the fastest and 9 the slowest. You'll have to be patient — it takes one frame for a new speed to take effect. 

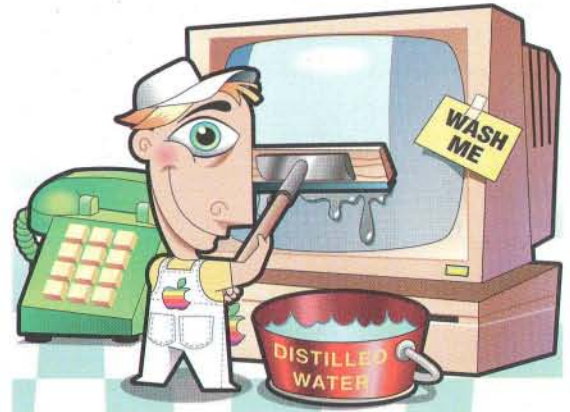


ILLUSTRATION / JOHN CORBITT

Write to **Tip Sheet**

c/o MacUser
950 Tower Lane
18th Floor
Foster City, CA 94404

You can also send your tip to Gregory Wasson (72511,36) on ZiffNet/Mac, MacUser's on-line service. We pay \$25 for every undocumented tip we print, and the Tip of the Month earns \$100; see page 4 for more details.

READER TIPS / compiled by Gregory Wasson

Photoshop 2.5

A frequently overlooked trick in Adobe Photoshop 2.5 is to use the New Window command to see multiple views of large images; it lets you avoid time-consuming scrolling. Choose New Window from the Window menu to get another view of the current image. Changes made in either window affect the original image.

Yolanda Jefferson
Biloxi, MS

FrameMaker 4.0

Frame Technology's FrameMaker 4.0 has a powerful navigational tool — the Cross-Reference dialog box — that serves the same function but far surpasses the features of the Go to Page dialog box. The Cross-Reference dialog box lets you go to any paragraph in any open FrameMaker document. This feature is often overlooked, because users mistakenly assume they can use it only if the document has cross-reference markers.

To use it, choose Cross-Reference from the Special menu, select

the document you want to go to from the Source Document pop-up list, select a Source Type, select the paragraph you want by highlighting one of the lines in the Reference Source scroll box (where the first few words of each paragraph appear), and click on Go To. Presto — you're there.

David Atkinson
Santa Cruz, CA

WordPerfect 3.0

WordPerfect 3.0 has a built-in macro for creating drop caps, but the macro automatically places a frame around the drop caps. If you want to get rid of the frame, you can do so by editing the Drop Cap macro. Go to the Tools menu, select Macro, select Edit, click on the Drop Cap macro, and click on the Edit Content button. Locate the line in the macro that says Box Frame (On), and change it to Box Frame (Off). Save the macro. That pesky frame will be gone.

Ben Groenberg
Salt Lake City, UT

CIM 2.2.2

A bug in CompuServe's CIM (CompuServe Information Manager) 2.2.2 makes filenames appear in the Out Basket, In Basket, and Filing Cabinet for files that aren't really there.

If you have some of these ghost files, hold down the Option key as you open the troublesome Basket or Filing Cabinet that contains one or more of these files. This forces CIM to rebuild the cache files that track the contents of these areas. If that doesn't work, quit CIM and throw away the cache files, which you'll find in the CIM Folder within the Filing Cabinet, In Basket, and Out Basket folders. The next time you run CIM, the program will rebuild the cache files and leave out the ghosts.

Jennifer Heisler
Wilmington, DE

Universal SoftPC

Save disk space and make Insignia Solutions' Universal SoftPC start up faster by customizing it for the Mac. Universal SoftPC and other Insignia DOS emulators usually install the MSCDEX (Microsoft CD Extension) CD-ROM driver, which you don't need unless you're going to use DOS CD-ROMs on your Mac. You can delete the MSCDEX driver file from the Insignia directory by using standard DOS commands. Alternatively, you can delete the code `mscdex.exe`, which loads the MSCDEX driver, from the `autoexec.bat` file.

Steve Huey
Tampa, FL

TIP OF THE MONTH**Excel 4.0: Changing Dates**

For those who want to change the default date format in Microsoft Excel 4.0 to day/month/year, a format used outside the U.S., here are two ways to do it (other than manually entering it into the header or footer):

- If you're using System 7.1 or later, just change the short-date format in the Date & Time control panel.
- Create a command macro that inserts the date in the new format for you. Choose New from the File menu, and select Macro Sheet from the list of types of documents you can create. To affect the footer, type the following code into the first two cells in column A:

```
=PAGE.SETUP(,TEXT(NOW(),"dd-mm-yy"))
=RETURN()
```

Select the first cell, choose Define Name from the Formula menu, type a name such as DateFormat in the Name box, click on the Command button, and click on OK. Your macro is complete.

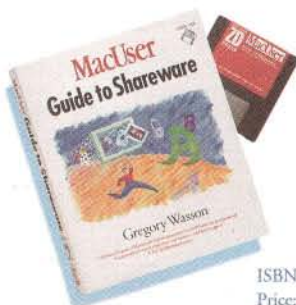
To apply the macro to any Excel document, open the document, select Run from the Macro menu, click on the name of the macro you've just created, and click on OK. To check the results, go to Print Preview, on the File menu.

To place the date in a header, perform the same steps but change the code slightly by removing the first comma, as shown here:

```
=PAGE.SETUP(TEXT(NOW(),"dd-mm-yy"))
=RETURN()
```

Albert Said
Carmel, CA

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| 24-bit color on large screen displays up to 21-inch at 1152 x 870 | YES | NO | NO |
| QuickDraw acceleration | YES | NO | NO |
| Pro Features: Device control | YES | NO | Optional encoder with genlock for \$649 |
| SMPTE time code | YES | NO | |
| RGB video input | YES | NO | |
| Price | \$4199 | \$4499 | \$1799 |

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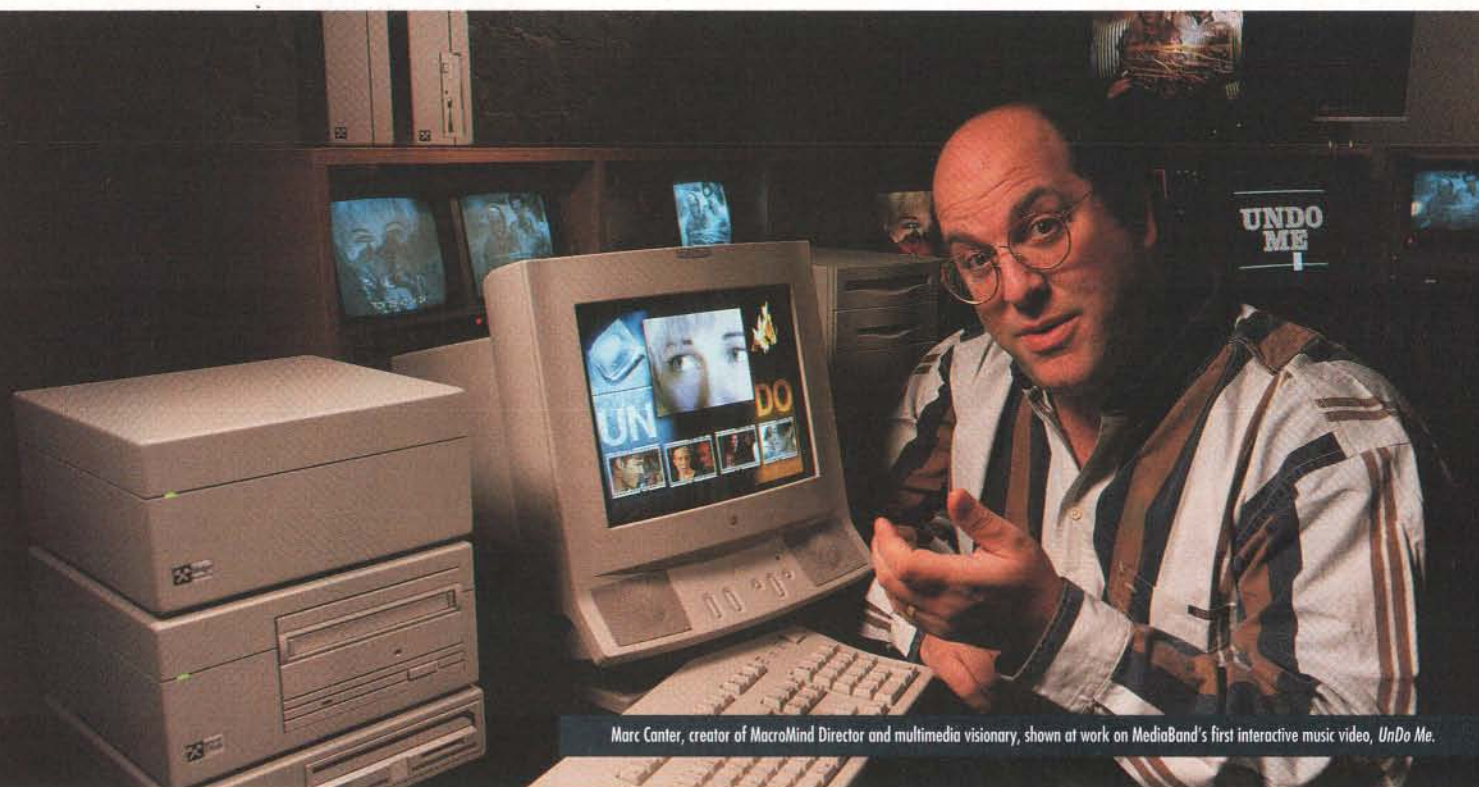
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Marc Canter, creator of MacroMind Director and multimedia visionary, shown at work on MediaBand's first interactive music video, *UnDo Me*.

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Help Folder



What to do when your Newton loses time, a simple trick for making an old drive compatible with ever-changing Mac technology, and a new diet plan for your RAM disk. BY ANDY IHNATKO AND BOB LEVITUS

Timely MessagePad

Q. My Newton MessagePad keeps great notes but lousy time. I've replaced the backup battery, but it still loses time — sometimes minutes, sometimes hours. Is this just the price of being one of the first to buy a MessagePad?

Sharon Nye
via ZiffNet/Mac

ANDY: No, the price of being first was \$490 over the cost of the next model. What you've got there is a quirk caused by the way the MessagePad records the time. Normally the Newton keeps perfect time, but when you use the Reset button, the MessagePad resets the clock to a time stored in backup memory. The problem is that the time in backup memory is updated only every five minutes while the MessagePad is running. Furthermore, while the MessagePad is in Sleep mode, the time isn't updated, so the clock can lose hours. Wake up the Newton before resetting it, to avoid this problem.

Old Drive, New System

Q. I can't get the external hard drive I used with my old Mac 512Ke to work with my new Performa, which is running System 7. I set the hard drive to SCSI ID 1, used SCSI-Probe, and tried Mounter 3.2, and it still doesn't mount. Can you tell me what to do?

Fred Pollak
Whitestone, NY

Write to Help Folder

c/o MacUser
950 Tower Lane
18th Floor
Foster City, CA 94404

Don't want to wait for an answer? Post your question on ZiffNet/Mac, MacUser's on-line service, and get a reply from Bob (76004, 2076), Andy (72511, 204), or one of the other MacUser experts.

BOB: The problem, Fred, is that the disk of your old external hard drive was initialized with a formatter that was not System 7-compatible. At the very least, you need to install disk drivers that are compatible with System 7. It may be that your drive is so old that you will have to back up the disk and then initialize it with a System 7-compatible formatter.

The formatter you use depends on the drive's vendor. For instance, if it's an Apple drive, you can use Apple's HD SC Setup, on the System 7 Disk Tools disk. In this case, you should be able to update the driver without initializing the disk. If your drive was made by a vendor that's gone out of business after all this time, you will need to get a third-party formatter, such as Hard Disk ToolKit (\$199), from FWB (415-474-8055), or Drive7 (\$79.95), from Casa Blanca Works (415-461-2227).

Downsizing a RAM Disk

Q. I want to set up a RAM disk to hold my 12.8-megabyte System Folder. The problem is that a RAM disk large enough to hold my System Folder leaves me only a few megabytes of RAM for running applications.

How can I trim my System Folder but not lose the control panels and extensions I've grown attached to?

Robert Kerner Jr.
Port Washington, NY

BOB: You can cut down the size of your RAM disk with Conflict Catcher II (\$51.95), from Casady & Greene (800-359-4920 or 408-484-9228). It lets you build a RAM disk with tiny aliases of your beloved extensions and control panels and leave the big, fat original files on your hard disk. Or you can use RAM Doubler (\$99), from Connectix (800-950-5880 or 415-571-5100), to double the available RAM.

For those of you who are wondering what a RAM disk is, it's a pseudodisk made out



THE BASICS

Q. I would like my great-grandkids to be able to read the journal I'm printing from my Mac. How long can I expect pages printed on a laser printer to last? Would they last longer if they were photocopied?

Timothy Bogar
Lansing, MI

ANDY: Output from a laser printer is just as stable as anything from a photocopier. To be on the safe side, use a light toner setting and don't use vast areas of darkness, or pages may imprint on each other during storage.

The real battle for preserving your work is fought on the paper front. Standard paper generally becomes brittle after 20 to 50 years, whereas a sheet of acid-free paper manufactured today should remain intact until the year 2194 and beyond. Likewise, recycled paper is more susceptible to acid damage than nonrecycled stock.

If you're going to use protective bags, get ones made of polyethylene or Mylar. Polypropylene, which is found in a lot of garbage bags, produces gases that harm paper.

Line storage boxes with a single layer of acid-free paper to protect your journal from the acid in the cardboard. Make sure air can circulate around and through the box.

Finally, if you're truly serious about preserving your journal for the ages, consider purchasing an optical drive. Optical cartridges are the most impervious form of data storage on the market, and as long as you leave your great-grandkids a Mac, an optical drive, manuals, and possibly a small diesel generator, you're certain of success. The only thing that truly lasts forever is instant coffee, but optical cartridges are the next-best thing.

of random-access memory — a very cool thing. Whatever you store on the RAM disk, usually the System Folder or applications that access the hard disk frequently, runs like a bat out of hell, because access times for RAM are so much faster than access times for magnetic or optical storage media.

The RAM is “borrowed” from the memory installed in your Mac. For example, if you have 32 megabytes of memory and create an 18-megabyte RAM disk, you’ll have 14 megabytes of memory left over for running applications.

You can create RAM disks with shareware programs, such as Roger Bates’ RamDisk+ (filename RAMDSK.SIT, in Library 3 of the Download & Support Forum on ZiffNet/Mac), or commercial products, such as Maxima (\$99), from Connectix. The option of creating RAM disks is part of the system software of all PowerBooks, Quadras, and Centrises.

Ready, Set, Startup

Q. Sometimes, in my zeal to Mac, I press the power switch without first turning on my external hard-disk drive. Does it hurt

anything to turn my hard drive on after my Mac has started up, or will this somehow harm my Mac, the same way unplugging the SCSI cable would?

Scott Klein
Orange, CT

BOB: My research didn’t reveal any reason you have to power up all of your SCSI devices before you start up your Mac. Leave the drive off until you need it.

I should point out, though, that this technique doesn’t work with every SCSI device. Some SCSI devices absolutely must be turned on, or your Mac won’t boot. The only way to tell if your SCSI device is one of these is to leave it off while you power up your Mac. If you see a flashing question mark, you’ve got one.

ANDY: If you have even one external SCSI device, SCSIProbe belongs in your System Folder. SCSIProbe mounts SCSI devices that are turned on after you’ve booted your Mac (see figure 1). You can get it for free from any on-line service, for criminy’s sake! (To find

| SCSIProbe | | | | |
|------------------------------------|------|---------|-------------------|---------|
| SCSIProbe 3.5 | | | | |
| ID | Type | Vendor | Product | Version |
| 0 | DISK | QUANTUM | LP80S 980809404 | 3.3 |
| 1 | | | | |
| 2 | | | | |
| 3 | ROM | SONY | CD-ROM CDU-800... | 1.9a |
| 4 | | | | |
| 5 | | | | |
| 6 | DISK | MAXTOR | LXT-340S | 6.75 |
| 7 | CPU | APPLE | MACINTOSH IIfx | \$067C |
| <div>Update Mount Options...</div> | | | | |

figure 1 / You may not have to turn on all the SCSI devices connected to your Mac at startup. If you want to leave one or more of them off until you need them, use the shareware program SCSIProbe and mount them later.

it on ZiffNet/Mac, go to Library 3 of the Download & Support Forum and search for the filename SCSIProbe.SIT.) To mount a SCSI device once SCSIProbe is installed, switch on the device and press Command-space bar — and boom — it’s mounted. Just don’t switch the device off until you’ve shut down your Mac, in case you have open files on that device. ☹

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Direct Line

MAIL ORDER SECTION



For many of you, mail-order is your primary means of purchasing Macintosh products and services. That's why MacUser has put together the following special section. Direct Line offers a convenient place to quickly find the products you need from the vendors you want to buy from. But before you shop by phone, look for the mail-order company that is best for you. Here are a few tips to help you get the most out of your buying experience.

How to Buy Mail Order Products

Research The Company

Well-established companies tend to be reliable, but if you're not sure how well established a company is, it pays to do a little research and ask a few questions.

Know What You Want

Know exactly what you want before you call. Magazines, on-line forums, and user groups are all good places to seek advice.

Check Compatibility

To avoid having to return merchandise, find out whether the product you're interested in is compatible with your system.

Pay With Credit

Whenever possible, use a credit card. Some credit-card companies do such

things as double your warranty or give you a refund if you find a lower price elsewhere. If you have a problem, your credit-card company will deal with the mail-order company.

Confirm Prices

Confirm the price when you place your order, including delivery charges. Some companies will waive the delivery charge.

Delivery Methods

Ask about delivery methods — find out what carriers are used, how fast they are, and how much each one costs. Record delivery information.

Return Policies

Because you're buying sight unseen, make sure the company has a return policy you're comfortable

with. Find out if you're responsible for paying shipping charges on returned goods and whether you'll be charged a restocking fee.

Check Packing Slips

Before you use your new merchandise, make sure it's exactly what you ordered — the correct model or version number, for example. It's easier to return goods before they've been unpacked.

Repair/Replacement Services

If you're buying hardware, find out how the company handles repairs or replacements.

Technical Support

Technical support varies from company to company. Make sure you know what help is available.



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| 520MB | 3.5" | 9MS | \$ 575 | \$ 635 |
| 1.2GIG | 3.5" | 8.5MS | \$ 825 | \$ 885 |

Seagate

5 YEAR WARRANTY

| CAPACITY | SIZE | ACCESS | INTERNAL | EXTERNAL |
|----------|-------|--------|-------------|----------|
| 545MB | 2.5" | 9MS | Hawk 1 | \$ 685 |
| 1.2GIG | 3.5" | 9MS | ST11200N | \$ 899 |
| 1.2GIG | 3.5" | 9MS | ST31200N | \$ 899 |
| 2.2GIG | 5.25" | 12MS | Wren 9 | \$ 1515 |
| 2.4GIG | 3.5" | 9MS | ST12400N | \$ 1555 |
| 2.0GIG | 3.5" | 8MS | Barracuda 1 | \$ 1585 |
| 2.5GIG | 3.5" | 8MS | Barracuda 2 | \$ 1855 |
| 2.5GIG | 3.5" | 8MS | WIDE | CALL |
| 3.4GIG | 5.25" | 10MS | Elite 3 | \$ 2195 |

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| 1.3-8GIG | Archive Turbo* | 4MM | \$ 1039 | \$ 1099 |
| 1.3-5GIG | Exabyte 8205 | 8MM | \$ 1539 | \$ 1599 |
| 1.3-10GIG | Exabyte 8505 | 8MM | \$ 2179 | \$ 2279 |
| 4.0-8GIG | Sony 4000 | 4MM | \$ 1089 | \$ 1149 |
| 4.0-8GIG | Sony 5000 DDS-2 | 4MM | \$ 1189 | \$ 1249 |

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|---------------|-------|--------|---------|--------|
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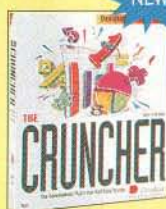
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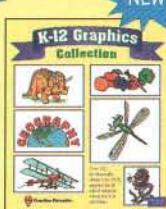
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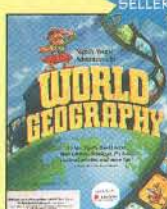
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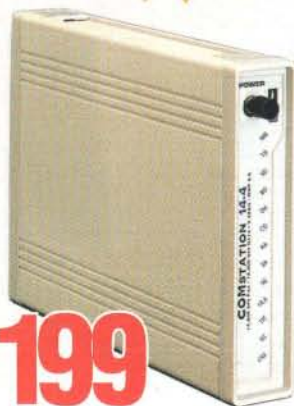
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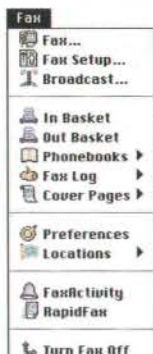
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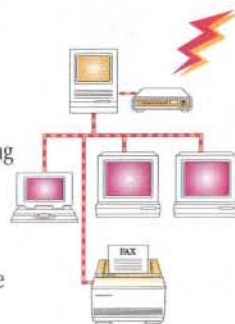
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| 270MB | 3.5" LP 10ms | \$275 | \$335 |
| 340MB | 3.5" LP 10ms | \$285 | \$345 |
| 540MB | 3.5" LP 10ms | \$475 | \$535 |
| 1000MB | 3.5" HH 10ms | \$885 | \$945 |
| 1200MB | 3.5" HH 10ms | \$995 | \$1,055 |
| 1800MB | 3.5" HH 10ms | \$1,155 | \$1,215 |

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Seagate

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|----------|------------------|----------|----------|
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| 1900MB | Barracuda 1, 8ms | \$1,545 | \$1,605 |
| 2400MB | Barracuda 2, 8ms | \$1,825 | \$1,885 |
| 2400MB | 3.5" HH 9ms | \$1,595 | \$1,655 |
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| UC840/AV | 24-bit color, 800x400dpi | \$999/799 |
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| MODEL | INTERNAL | EXTERNAL |
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| MODEL | CAPACITY | SIZE | MacKit |
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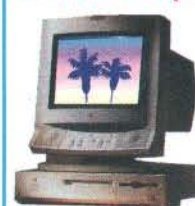


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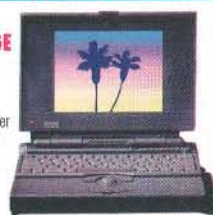
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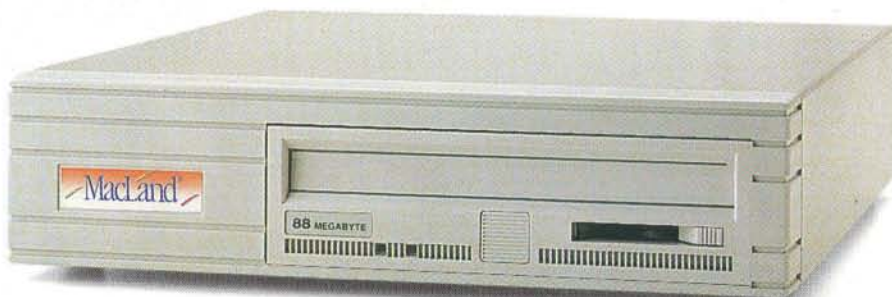
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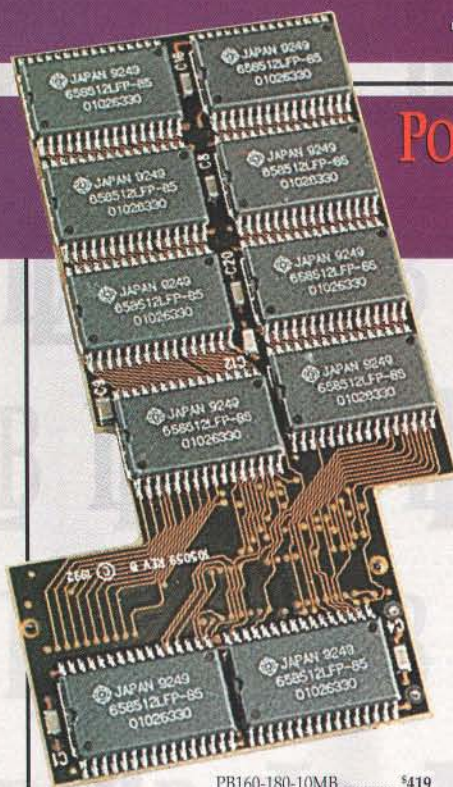
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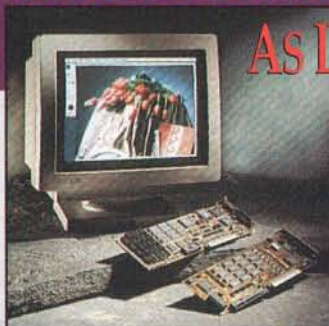
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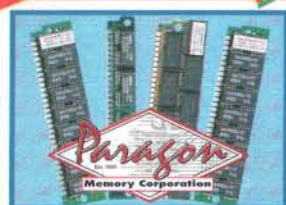


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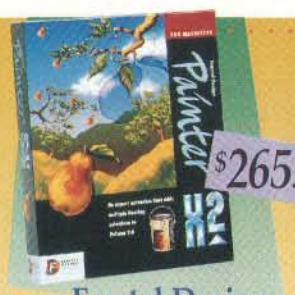
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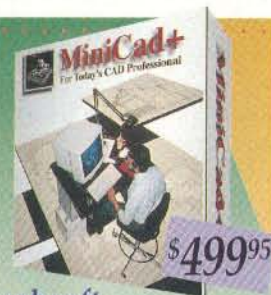
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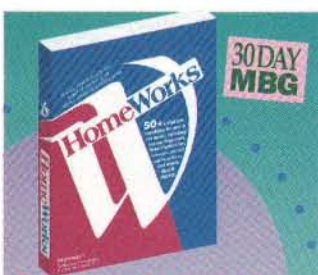
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- 15014 ChemOffice Plus 2.0 1999.95
- ★ CheckMark ... 60 day MBG
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- 3903 ClarisWorks 2.1 for Mac 199.95
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- ★ Gold Disk
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- 11269 Inspiration 4.0 165.95
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- 3669 Excel 4.0 295. 5454 MS Office 3.0 375.
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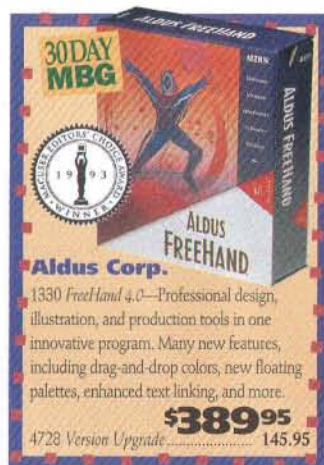
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- 12083 Design Your Own Railroad 39.95
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- 4145 Adobe Premiere 3.0 \$449.95
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- 3008 Apple Font Pack 45.95
- ★ Ares Software ... 30 day MBG
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- ★ Broderbund Software
- 13603 Print Shop Deluxe 49. 3572 Kid Pix 34.
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- 14158 Impact or 2518 MacDraw Pro ea. 269.
- ★ DeltaPoint ... 60 day MBG
- 12974 DeltaGraph Pro 3 139.95
- 15819 DeltaGraph Pro 3 Comp. Upgrd. 79.95
- ★ Deneba Software ... 30 day MBG
- 11055 artWORKS 99. 3227 Canvas 3.5 259.
- ★ Fractal Design
- 10402 Painter 2.0A 265. 1564 PainterX2 94.95
- ★ Gryphon
- 4202 Morph 2.0 154.95
- ★ Harvard Systems Corp. ... 30 day MBG
- 11193 Kai's Power Tools for Photoshop 89.
- ★ Imagine, Inc.
- 14438 Super Bundle EPS 94.95
- 14457 Value Pak 1 EPS 64.95
- 14444 Office Clips EPS 25.95
- ★ Manhattan Graphics ... 30 day MBG
- 4990 Ready, Set, Go! 6.0 219.95
- ★ Quark
- 7612 QuarkXPress 3.2 589.
- ★ Ray Dream ... 30 day MBG
- 12264 JAG II 89. 4761 Designer 3.0 249.
- ★ SoftMaker, Inc.
- 10556 Infini Type Plus 52.95
- ★ T/Maker ... 30 day MBG
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- 3144 Incred. Images or 3147 CD-ROM ea. 89.95
- ★ Virtus
- 3185 WalkThrough Pro 249.95
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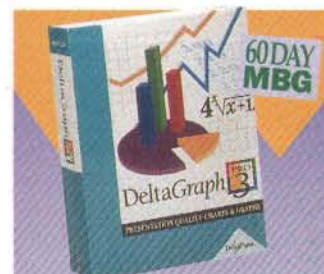
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- ★ Abbott Systems ... 30 day MBG
- 5236 CanOpener 2.0 59. 9578 Kaleidoscope 25.
- ★ Aladdin Systems ... 30 day MBG
- 7410 StuffIt SpaceSav. 34.95 6740 Deluxe 69.
- ★ Apple Computer ... 30 day MBG
- 1206 At Ease 45.95 7072 QuickTime Kit 105.
- 1074 System 7.1 59.95 13047 S7 Pro 99.95
- 10478 System 7.1/Font Pack Bundle 62.
- ★ ASD Software
- 15865 ASD Security Trio:
FileGuard/TrashGuard/FileDuo 149.95
- ★ Berkeley Systems ... 30 day MBG
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- 5737 After Dark 2.0x (30+ screens!) 29.
- 2198 More After Dark 25. 2196 Bundle 39.95
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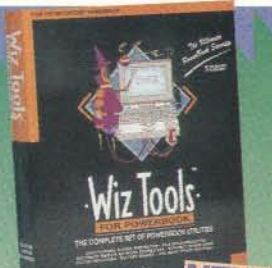
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15191 33MHz w/FPU 779.95
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- 811 Jugglers, Inc.**
- 14676 Underware \$29.95
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- 1727 *CalendarMaker* 39. 7927 *QuickKeys* 105.
- ★ **Central Point ... 30 day MBG**
- 5041 *MacTools 3.0* 85.95 11812 Upgd. 99.95
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- 14789 *RAM Doubler* or 10765 *Virtual* ea. 55.
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- 9115 *DiskFit Direct 1.0* 29. 3393 *Pro* 72.
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- 12989 *Thinkin' Things* 39.
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- 14214 *Creative Writer* 42.95
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- Radius**
- 1738 *PrecisionColor Pivot (req. interface)* 899.95
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- 10529 *CPD-1730 17"* 1099.
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- 12704 *20+Color* 1849. 10321 *ColPg. T1611* 1299.
- 10322 *Presenter* or 8028 *Futura IIS* ea. 469
- 8005 *Ultura LX* 1199. 7985 *EtherDock* 649.

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- ★ **Claris Clear Choice ... 30 day MBG**
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- 13600 *The Tortoise and the Hare* 34.
- 13602 *The New Kid on the Block* 34.
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- 1485 *Iron Helix* 59.95
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- Apple Computer**
- 7073 *Mac PC Exchange* 59.
- 10453 *AppleShare 4.0* 1469. 14576 Upgd. 539.
- 7101 *AppleTalk Remote Access 1.0* 149.
- 14231 *Remote Access 2.0 Client for Mac* 54.95
- Asanté Technologies, Inc.**
- Asanté Lite Ethernet Cards ea. 125.
- 2775 *10/T Hub-8* 249. 2772 *10/T Hub-12* 499.
- BOCA Research**
- 11052 *M1441 V.32bis FaxModem* 159.95
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- CommForce**
- 15862 *4-Sight* 599.95
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- 1676 *Membership Kit* 25.
- 1673 *Navigator 3.2* 49.
- ★ **DataViz ... 60 day MBG**
- 1823 *MacLink Plus/PC Connect 7.5* 129.
- 12613 *MacLink Plus/Easy Open Translators* 89.
- 12093 *MacLink Plus/Translators Pro 7.5* 95.
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9427 *PB160 8MB* 449.95

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- 9516 PowerPath 105, 9518 LocalPath 139.
- 6922 ReplicaMac 69.95 7407 (10 user) 499.95
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- 4089 SoftPC... 109, 10534 SoftPC Pro ... 215.
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- * Zoom Telephonics ... 30 day MBG
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- 3553 FaxModem VFX V.32bis 164.95
- 14152 FaxModem VFX 14.4V for Mac 174.95
- 7917 FaxModem PKT (pocket) 79.95

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- 14322 PE 340 FMF 579.95
- 14318 PocketHammer1000FMF 1349.95
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- 8781 Mac Transportable 90 PRO 369.95
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- CoStar
- 1885 Stingray ADB 79.95
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- 15339 SelectPress 600/600 Pro Printer 3749.95
- * GDT Software ... 30 day MBG
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- Interex Computer Products
- 12862 105 Key Deluxe Keyboard 99.
- * Kensington ... 30 day MBG
- 2547 Turbo Mouse 4.0 ADB 107.
- Key Tronics
- 6974 Mac Pro+Keybd 135, 1070 TrakPro 219.
- * Microtek Labs, Inc. ... 30 day MBG
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- 13658 PS23 1399, 13659 PS65 1599.
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- 13748 UC630 719.95 13751 UC1260 1469.95

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- 11663 StyleWrit. II Cart. 23, 11669 (3 pk.) 63.
- LaserWriter Toners: Pers. 65, LW II 85.
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- 13549 PowerBook Leather Satchel (black) 77.95
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- 7369 Notepad 35.95
- 13941 Business Commuter Case 114.95

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13659 microLaser Pro 600 PS65 1599.

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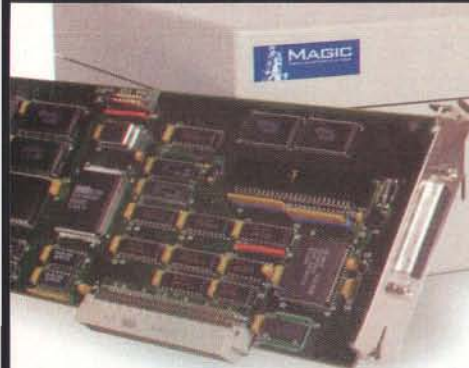
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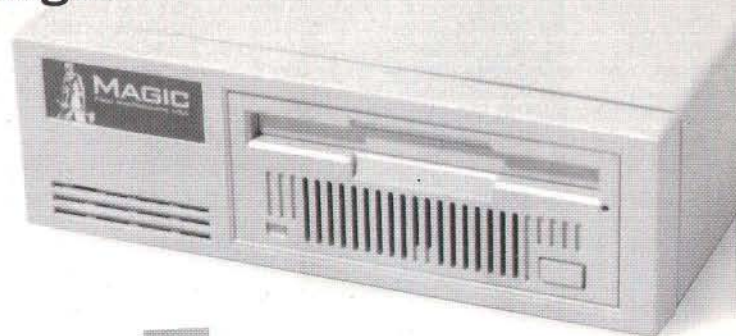
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 Take FileGuard, TrashGuard & FileDuo together and save!
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 This triplespeed CD-ROM drive is the fastest available! Its 200 msec access time and 450KB/sec transfer rate deliver superior performance. Other features include: automatic lens cleaning, shielded optical pick-up, SCSI-2 interface, audio playback capability and more.
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BrushStrokes
 BrushStrokes combines a sophisticated 32-bit paint program with a clear, fully illustrated How To Paint Guide. This rich collection of customizable tools, filters, and special effects allow you to translate your ideas from your imagination to finished output.
 Publisher: Clairis/ClearChoice
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 SID 0057
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 Now, when you buy Sketch!, you get Photoshop-the premier image processing and touch-up program or Illustrator-the pioneering illustration and graphic design program at a special low price!
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 Sketch!/Illustrator
 GRA 0523
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 SoftPC's award-winning emulation technology lets you run more than 50,000 DOS and NetWare applications on your Mac. Copy and paste from DOS to Mac. Includes MS-DOS 5.0 pre-installed, SoftNode and CD-ROM extensions!
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 COM 0186
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 BUS 0320
\$109

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 Publisher: Maxis/Cyberpuppy
 EDU 0555
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Retrospect Remote
 Powerful Mac network backup software for centralized backup and archiving. Create scripts with multiple sources, destinations, and file-selection criteria with ease. Then schedule the scripts so your backups run automatically on any day and at any time. Supports compression, encryption and verification.
 Publisher: Dantz Development
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 If you're an armchair athlete or a sports trivia buff, this edition of Jeopardy! is just for you! Dive into past and current trivia in football, baseball, basketball, and hockey. Explore categories like boxing, bowl games, college standouts, Olympic events, and many others! Over 3,500 challenging questions!
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 11 award-winning telecommunications program-perfect, low-cost solution to every Mac telecommunicator's needs. Offers power associated with products costing hundreds more, yet far more flexible and easier to learn. Proclaimed as a precision communications tool by MacWorld.
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 COM 0060
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 The Prometheus Home Office is a data modem, fax modem, answering machine, and line switching device, all in 1! A 2400 bps external data modem with V.42bis/MN-5 support, plus 9600 bps send/receive fax capability and voice mail.
 Manufacturer: Prometheus
 MOD 0084
\$129⁹⁵

Marvel Comics Screen Posters
 Join Spider-Man, Wolverine, the X-Men, and your favorite Marvel Comics super heroes in the fight against villainous computer boredom! Includes still images of classic confrontations, milestone covers, original artwork and more! Images work both as screen savers and desktop art.
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A ClubMac Quantum Drive is the best "plug-and-play" storage solution for your Macintosh computer. All Quantum drives are backed by ClubMac's 30-Day Money Back Guarantee and TWO Year Warranty (Go-Drives include ONE Year Warranty).

GO-DRIVE SERIES

2.5" POWERBOOK DRIVES

| Capacity | Access | Internal | External |
|----------|--------|----------|----------|
| 85mb | 17ms | \$199 | \$319 |
| 127mb | 17ms | \$235 | \$355 |
| 170mb | 17ms | \$259 | \$379 |
| 256mb | 17ms | \$339 | \$459 |

External Go-Drives come in battery powered case as shown

POWERBOOK DRIVES



**BATTERY POWERED
PORTABLE DRIVE**

GO-DRIVE SERIES

The Quantum Go-Drive Series are fast, lightweight, advanced 2.5-inch hard disk drives. Go-Drives are perfect for use with Apple PowerBooks with available capacities from 85MB to 256MB.

QUANTUM DRIVES

3.5" LOW PROFILE, LOW POWER

| Capacity | Access | Internal | External |
|----------|--------|----------|----------|
| 170mb | 17ms | \$185 | \$245 |
| 240mb | 11ms | \$239 | \$299 |
| 340mb | 11ms | \$289 | \$349 |
| 540mb | 10ms | \$479 | \$539 |
| 1080mb | 11ms | \$829 | \$889 |

3.5" HALF HEIGHT

| | | | |
|--------|------|--------|--------|
| 1800mb | 10ms | \$1099 | \$1159 |
|--------|------|--------|--------|

ELS, LPS AND PRODRIVE SERIES

The Quantum 3.5-inch hard disk drives are the optimal storage solution for entry level Macintosh systems to arrays of high-end workstations and network file servers. Available capacities from 127mb up to 1800mb. Quantum drives offer average seek times as low as 10ms, transfer rates up to 10 MB/sec, and SCSI-1/SCSI-2 interface. Performance enhancements include Quantum's Proprietary DiskCache and WriteCache firmware.



**FIVE YEAR
WARRANTY**



| Unformatted Capacity | Model | Description | Access Time | Actual MAC Capacity | Internal | External |
|----------------------|-------|-------------------|-------------|---------------------|----------|----------|
| 520mb | M2624 | 3.5" Half Height | 9ms | 496mb | \$489 | \$549 |
| 1.2GIG | M2694 | 3.5" Half Height | 8.5ms | 995mb | \$899 | \$959 |
| 2.4GIG | M2654 | 5.25" Full Height | 11.5ms | 2000mb | \$1389 | \$1489 |



**ClubMac
30 DAY
MONEY BACK
GUARANTEE**

Seagate 5.25-inch full height drives are available in capacities ranging from 1.6 gigabytes to 3.4 gigabytes. These drives feature and avg. seek time as low as 11ms, 256KB cache buffer, rotational speed up to 5,400 RPM, SCSI-2 interface, 200,000 hour MTBF and ONE Year Warranty

| Unformatted Capacity | Model | Description | Access Time | Actual MAC Capacity | Internal | External |
|--------------------------|----------|-------------|-------------|---------------------|----------|----------|
| 3.5" LOW PROFILE | | | | | | |
| 1.2GIG | ST31200N | | 10ms | 1000mb | \$889 | \$949 |
| 3.5" HALF HEIGHT | | | | | | |
| 1.2GIG | ST11200N | | 10.5ms | 1000mb | \$869 | \$929 |
| 1.9GIG | ST11900N | | 9ms | 1600mb | \$1199 | \$1259 |
| 2.4GIG | ST12400N | | 9ms | 2000mb | \$1599 | \$1659 |
| 1.9GIG | ST11950N | Barracuda 1 | 8ms | 1650mb | \$1549 | \$1609 |
| 2.4GIG | ST12550N | Barracuda 2 | 8ms | 2050mb | \$1829 | \$1889 |
| 5.25" FULL HEIGHT | | | | | | |
| 2.4GIG | ST42400N | Elite-2 | 11ms | 2050mb | \$1739 | \$1839 |
| 3.4GIG | ST43400N | Elite-3 | 11ms | 2750mb | \$2159 | \$2259 |

FEATURING



**SyQuest®
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**ClubMac
30 DAY
MONEY BACK
GUARANTEE**



**NEW CLUBMAC
270MB REMOVABLE**

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|------------------------------|----------|----------|
| ClubMac 44mb | \$259 | \$299 |
| ClubMac 88c | \$385 | \$425 |
| ClubMac 105mb | \$359 | \$399 |
| ClubMac 270mb | \$619 | \$659 |
| CARTRIDGES | | |
| 44mb/105mb | | \$59 |
| 88mb | | \$89 |
| 270mb | | \$99 |
| 3.5" DUAL REMOVABLES | | |
| Dual 105mb | | \$729 |
| Dual 270mb | | \$1179 |
| Dual Combo 105/270* | | \$1029 |
| 5.25" DUAL REMOVABLES | | |
| Dual 44mb | | \$549 |
| Dual 88c | | \$649 |
| Dual Combo 44/88c* | | \$729 |

* Dual Combos come with both types of media

All SyQuest drives include a TWO Year Warranty, SCSI Director formatting software, and necessary cables for "plug-and-play". All SyQuest cartridges include a ONE Year Warranty.

DAT BACKUP by CLUBMAC

CLUBMAC DAT DDS & DDS-DC DRIVES

provide up to 5.0 gigabytes of cost effective and highly reliable data storage on a pocket size Digital Audio Tape (DAT) cassette. Available in 2 models: ClubMac DAT using the DDS tape format and the ClubMac DAT/DC with the efficient DDS-DC compression format. They are ideal for hard disk backup, archival storage, data file distribution.

- 20 sec average data access time (60m tape)
- 14mb/min backup rate, 180KB/sec transfer rate
- MTBF of 60,000 hours • TWO Year Warranty
- Includes Retrospect v.2.0 Backup Software and ONE 90m Tape Cassette



**FREE
RETROSPECT V2.0
BACKUP SOFTWARE
(\$139 VALUE)**



| Capacity | Model | Format | Media | Internal | External |
|----------|----------------|--------|----------|----------|----------|
| 2.0GIG | ClubMac DAT | DDS | 60m, 90m | \$749 | \$799 |
| 2.4GIG | ClubMac DAT/DC | DDS-DC | 60m, 90m | \$999 | \$1049 |

CLUBMAC DAT/2 DDS-2 DRIVE

provides up to 8.0 gigabytes of high performance, cost effective and reliable data storage on a pocket size Digital Audio Tape (DAT) cassette. The ClubMac DAT/2 has a significant number of key features which make it adaptable to a wide range of user environments and system applications, including:

- 20 sec average data access time (60m tape)
- 28mb/min backup rate, 366KB/sec transfer rate
- MTBF of 180,000 hours
- ONE Year Warranty
- Includes Retrospect Remote v.2.0 (3 pack) Network Backup Software and ONE 120m Tape Cassette



**FREE
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| | | | | | |
|--------|---------------|-------|----------------|--------|--------|
| 4-8GIG | ClubMac DAT/2 | DDS-2 | 60m, 90m, 120m | \$1329 | \$1379 |
|--------|---------------|-------|----------------|--------|--------|

| Verbatim | | DAT TAPES | ea | 10 pack | OPTICAL MEDIA | |
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| 4mm (60m) | | | \$12/\$110 | | 3.5" 128mb | \$35 |
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CLUBMAC OPTICAL DRIVES



CLUBMAC 3.5" 128MB OPTICAL

"Low price and all-around value characterize this 128mb rewritable drive."

-Macworld Editors' Choice December 1993

| | Internal | External |
|---|----------|----------|
| ClubMac 3.5" 128mb Fujitsu Optical (M2511A) | \$839 | \$869 |
| Fujitsu 3.5" 128mb Dynamo | | \$869 |
| ClubMac 3.5" 128mb Epson Optical | \$759 | \$789 |
| ClubMac 5.25" 650mb Sharp Optical | \$1669 | \$1699 |
| Hewlett-Packard 5.25" 1.3GIG Optical External | | \$2699 |

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.



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"Without question the best bargain among 5.25" drives."

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E-Machines T16 II

- 640 x 480 up to 1024 x 768
- Comp. with on-board graphics on the Quadra and Centrals

\$1139
E-Machines T16 II

MaeUser Magazine
January 1993

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PaintBoard Lightning

The PaintBoard Lightning is a highly accelerated 24-bit NuBus graphics adapter. It delivers exceptional photo-realistic true color up to resolutions as high as 1024 x 768 making it ideal for imaging, color publishing and business productivity.

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PrecisionColor Display/17

\$1249
PrecisionColor Display/17

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PrecisionColor 24X \$959

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PrecisionColor Display/17

- "On-the-fly" resolution switching, built-in video
- 640 x 480 up to 1152 x 870
- Digital Controls
- 0.25mm dot pitch

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Rocket 33 \$965
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| 10THUB/8 | 10BT Hub w/8 10T, Thn port | \$229 |
| Mini EN/SC | Thn/10BT SCSI Ether w/DT & PB cable | \$297 |
| Mini EN/SC10T | 10T SCSI Ethernet w/DT & PB cable | \$237 |
| FN10TA | 10T FriendlyNet Media Adapter | \$65 |
| FN10TA | Thn FriendlyNet Media Adapter | \$65 |
| MC-II-E64 | Mac II & Perf 600, Thk/Thn, 64K | \$139 |
| MAC+II-E64 | Mac II & Perf 600, Thk, 10BT, 64K | \$139 |
| MC3NB | Mac II & Perf 600, Thk/Thn/10BT, 64K | \$189 |
| AP1001 | AsantePrint, Thk/10BT or Thk/Thn | \$329 |

Warranties: All items manufactured by ClubMac are returned to ClubMac for warranty repair. All other items carry manufacturer's warranty. **Money Back Guarantee:** All products manufactured by ClubMac carry a 30 day money back guarantee. ClubMac extends all other manufacturers' return policies to its customers. Non-ClubMac products carry 30 day money back guarantee when specified. **Returns:** Call for RMA number! Any product that is returned WITHOUT an RMA number will be refused. All product information and prices are subject to change without notice. Not responsible for typographical errors.

MODEMS

GLOBAL VILLAGE POWERPORT (PWRBKS)

Mercury/Bronze/Silver/Gold \$329/95/255/279

GLOBAL VILLAGE TELEPORT (Ext. Desktop)

Mercury/Bronze/Silver/Gold \$329/95/255/279

SUPRA MODEMS

SupraFaxModem 14.4 LC \$159
V.32bis, V.42bis w/FAXstf & Micro

SupraFaxModem 14.4 \$225
V.32bis, V.42bis w/FAXstf & Micro

SupraFaxModem PB 14.4 \$225
V.32bis, V.42 Internal for Powerbook

NEC

NEC MULTISYNC MONITORS

15" MultiSync 3V \$469
15" MultiSync 3FGe \$569
15" MultiSync 4FGe \$629
17" MultiSync 5FGe \$989
17" MultiSync 5FGe \$1099
21" MultiSync 6FGe \$1999

MacFG 24X / 24Xp \$1199/479

NEC Monitors carry a THREE Year Warranty.
NEC MacFG cards carry a ONE Year Warranty.

\$1249
MultiSync 5FGe

NEC PRINTERS

Silentwriter 95f (6ppm, 300 dpi, PS Level 2, 35 fonts) \$889
Silentwriter 640 (6ppm, 300 dpi, PS Level 2, 52 fonts) \$739
Silentwriter 1097 (10ppm, up to 600 dpi, PS Level 2) \$1379

NEC Silentwriter 640 carries a TWO Year Warranty. NEC Silentwriter 95f and 1097 carry a ONE Year Warranty.

NEC CD-ROM READERS

MultiSpin 3Xe (External, 195ms access time) \$589
MultiSpin 3Xi (Internal, 195ms access time) \$499
MultiSpin 3Xp (Portable, 250ms access time) \$439
MultiSpin 4X Pro (External, 180ms access time) \$935

HP DeskWriter 520 Inkjet Printer

\$299
HP DeskWriter 520

- Clear, sharp 600 x 300 dpi
- 3 ppm, 35 scalable fonts
- Light weight, only 4.3 lbs.
- Prints on plain paper, transparencies
- Standard LocalTalk/Serial interface
- EnergyStar Compliant

HP DeskWriter 310 carry a ONE Year Warranty
HP DeskWriter carry a THREE Year Warranty

SCANNERS

MICROTEK

ScanMaker IIg with Fractal Design Sketcher 1.0 \$489
ScanMaker IIsp with Photoshop 2.5 LE \$799
ScanMaker II with Photoshop 2.5 LE \$665
ScanMaker IIxe with Photoshop 2.5 \$1049

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MacFG 24X / 24Xp \$1199/479

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\$739
Silentwriter 640

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• Atlas Pack (World & US) • Lucas Game Pak II
• Pair of Quickshot Speakers

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Optional Color Kit Available

HP DeskWriter 310 \$369

with CutSheet Feeder (40-sheet), Optional Color Kit Available

DeskWriter \$289

300 dpi, 3ppm, 35 scalable fonts, LocalTalk/Serial interface

DeskWriter C \$389

300 dpi color, 3ppm black, 4.7ppm color, 35 fonts, LocalTalk/Serial

DeskWriter 550C \$579

300 dpi, Twin-Cartridge, 3ppm, 4.7ppm color, 35 fonts, LocalTalk/Serial

DeskWriter Inkjet 520 \$299

600 x 300 dpi, 3ppm, 35 fonts, LocalTalk/Serial

DeskWriter Inkjet 560C \$579

600 x 300 dpi color, 3ppm, 35 fonts, LocalTalk/Serial

EPSON

ScanTastic

ES-800C Pro-Mac \$1249

Scans up to 1600dpi, PhotoShop 2.5, ScanTastic, KAI's PowerTools

ActionScanning-Mac \$799

Scans up to 1200dpi, PhotoShop 2.5 LE & ScanTastic

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Turbo 040 (with FPU support)

25 MHz Turbo 040 \$749
33 MHz Turbo 040 \$915
40 MHz Turbo 040 \$1085

FastCache Turbo (128K cache for Turbo 040 family) \$165

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20 MHz Turbo 040i \$589
25 MHz Turbo 040i \$665
33 MHz Turbo 040i \$745

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Image 040 (Quadra/Centris) \$1839
Quad 040 (Quadra/Centris) \$1249
Charger (PhotoShop Accelerator) \$485
Charger Plus / PFS \$639/1829

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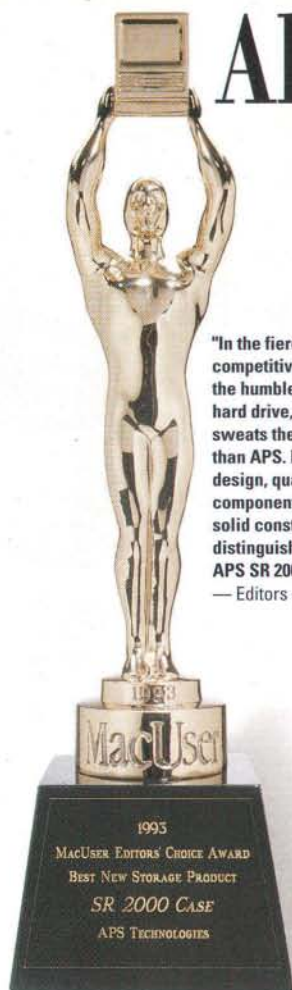
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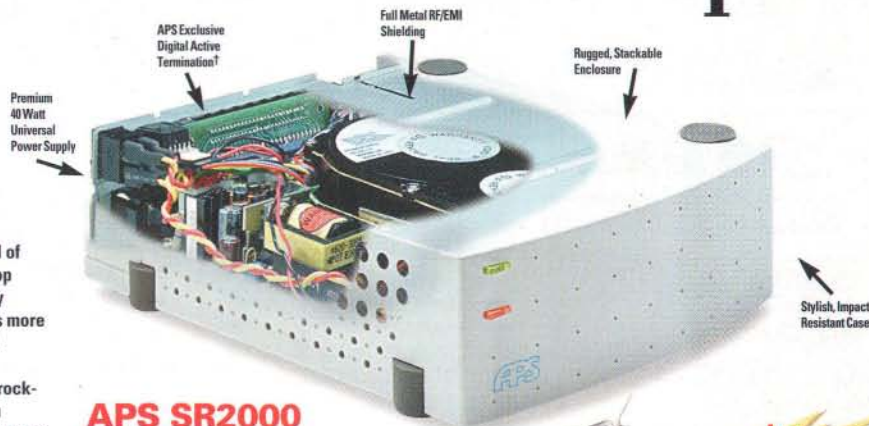


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|---|-------------|
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| Exclusive Digital Active Termination | ✓ |
| Provides Ideal Termination Power | ✓ |
| Drastically Reduces SCSI Retries | ✓ |
| Regulates SCSI Line Voltage | ✓ |
| Solves Bus Impedance Issues | ✓ |
| LED Activity Indicators Diagnostic Tool | ✓ |
| Easy Installation: Takes Seconds | ✓ |

APS HARD DRIVES

| Model | Capacity | Internal | SR2000 |
|-------|----------|----------|--------|
|-------|----------|----------|--------|

122MB - 257MB

| | | | |
|---------------------------|-------|-------|-------|
| APS Q 127 ² | 122MB | \$189 | \$279 |
| Quantum 127 mechanism | | | |
| APS Q 170 ² | 163MB | 199 | 289 |
| Quantum 170 ELS mechanism | | | |
| APS MX 240 ² | 234MB | 259 | 349 |
| Maxtor 7245 mechanism | | | |
| APS Q 270 ² | 257MB | 269 | 359 |
| Quantum LPS270 mechanism | | | |

* Internal drives for Quadra 800 and Centris 610 available.

324MB - 1029MB

| | | | |
|-----------------------------|--------|-------|-------|
| APS MX 345 ² | 324MB | \$379 | \$469 |
| Maxtor 7345 mechanism | | | |
| APS 340 ² | 327MB | 299 | 389 |
| 340 mechanism | | | |
| APS Q 540 ² | 516MB | 529 | 619 |
| Quantum 540 mechanism | | | |
| APS MS1.2AV ⁵ | 965MB | 999 | 1089 |
| Micropolis 2210AV mechanism | | | |
| APS MS1.2 ⁵ | 1001MB | 899 | 989 |
| Micropolis 2210 mechanism | | | |
| APS MS4110 ⁵ | 1002MB | 999 | 1089 |
| Micropolis 2210 mechanism | | | |
| APS Q 1080 ⁵ | 1029MB | 859 | 949 |
| Quantum 1080S mechanism | | | |

* Internal Price Listing

| Model | Capacity | Internal | SR2000 |
|-------|----------|----------|--------|
|-------|----------|----------|--------|

1611MB - 2845MB

| | | | |
|------------------------------------|--------|--------|--------|
| APS ST 1.6 ⁵ | 1611MB | \$1499 | \$1589 |
| Seagate ST11950 Barracuda mech. | | | |
| APS MS 1.7AV ⁵ | 1612MB | 1399 | 1489 |
| Micropolis 2217AV mechanism | | | |
| APS MS 1.7 ⁵ | 1682MB | 1299 | 1389 |
| Micropolis 2217S mechanism | | | |
| APS ST 2.0 ⁵ | 2040MB | 1869 | 1959 |
| Seagate ST 125500N Barracuda mech. | | | |
| APS MS 2.4G ⁵ | 2100MB | 1599 | *1699 |
| Micropolis 1926 mechanism | | | |
| APS MS 3.0G ⁵ | 2845MB | 2249 | *2349 |
| Micropolis 1936 mechanism | | | |

¹⁻⁵ Denotes length of manufacturer's warranty

* External Case is Special Full Height Only

POWERBOOK DRIVES

| Model | Capacity | LW Pro 630 | Internal | Companion II AC/DC |
|-------------------------|----------|------------|----------|--------------------|
| APS PB 85 ¹ | 80MB | \$249 | — | — |
| APS PB 170 ¹ | 160MB | 349 | \$299 | \$439 |
| APS T 213 ¹ | 202MB | 409 | 359 | 499 |
| APS PB 250 ¹ | 240MB | 449 | 399 | 539 |
| APS T 340 ¹ | 324MB | 579 | 529 | 649 |
| APS T 520 ¹ | 500MB | 949 | 899 | 1039 |

APS MS 1.2

The APS MS 1.2 provides the best mix of performance and price in its class. The 5400 RPM spindle speed of its Micropolis 2210 mechanism delivers spectacular sustained transfer rates and seek times averaging 9.1 ms.

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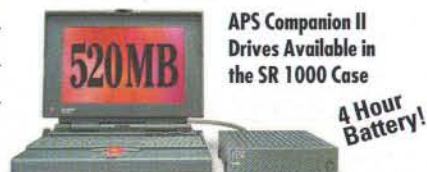


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SYQUEST

| | | |
|---------------------------|----------|-------|
| APS SQ 555 ² | 44MB | \$299 |
| APS SQ 5110c ² | 44/88MB† | 499 |
| APS SQ 3105 ¹ | 105MB | 429 |
| APS SQ 3270 ¹ | 270MB | 699 |

† Does not format 44MB cartridges

44MB cartridges — \$65 unformatted, \$70 formatted
88MB cartridges — \$100 unformatted, \$105 formatted
105MB cartridges — \$59 unformatted, \$64 formatted
270MB cartridges — \$95 unformatted, \$100 formatted
All SyQuest Drives Include 1 FREE Cartridge



CD ROM BUNDLE

| Model | Without Bundle | B.Y.O.B.* |
|------------|----------------|-----------|
| APS T 3401 | \$499 | \$399 |

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* Check and Charge Return or Replacement Warranty — The warranty length is limited to the longest original number next to each drive model. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
* All prices and specifications are subject to change without notice.
* Defective units subject to replacement fee.
* Hard drives include brackets, cables, and serial IDs required for operation with the specified hardware where applicable. All hard drives have 100% Technology Center performance with Apple System 7.1 software, at least 100MB unformatted, publicly distributed software, and APS Technology APS POWERBOOKS SCSI formatted hard disk partitions.
* All external drive products and cables come with a minimum 25 x 50 SCSI cable. Compression drives, (not cases) include a 50 x 50 PowerBook SCSI cable.
* International customers must pay for all shipping charges.
* Toll-free technical support is needed. Regular hours are 9 am to 5 pm Monday through Friday, 9 am to 5 pm Saturday, Central Time.

APS SQ 3105

\$429



APS 44MB SQ555

\$299

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MAGNETO OPTICAL

| Model | Internal* | SR 2000 |
|---------------------------|-----------|---------|
| APS 128MB MO ¹ | \$769 | \$799 |

Mechanism is Epson Magneto-Optical OMD-5010
All MO Drives Include 1 FREE Cartridge
128 MO cartridge — \$49 unformatted, \$55 formatted

TAPE DRIVES

| | |
|---------------------------|-------|
| APS T 155 MB Tape Backup♦ | \$479 |
|---------------------------|-------|

155MB Backup Tapes — \$19, 10 Pack \$170
♦ Only Available in ZFP Case.

POWERBOOK STUFF

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|---------------------------|------|
| APS SCSI DOC w/PowerMerge | \$39 |
|---------------------------|------|

Palm-Sized 25-30 PowerBook SCSI Adapter that includes a docking adapter for PowerBook and termination power indicator.
Receive Power-Merge Lite Free with every APS SCSI DOC!

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|--------------|------|
| APS SCSI BOY | \$29 |
|--------------|------|

Rugged Palm-Sized 25-30 PowerBook SCSI Adapters

| | |
|----------------|--------|
| APS PowerBalls | \$9.99 |
|----------------|--------|

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| Model | Capacity* | Internal | SR 2000 |
|----------------------------|--------------------|----------|---------|
| APS DAT ² | 1.8-26 on 90m tape | \$749 | \$799 |
| APS ProDAT ² | 4-56 on 90m tape | 949 | 999 |
| APS Turbo DAT ² | 4-56 on 90m tape | 1149 | 1199 |
| APS HyperDAT ¹ | 8-106 on 120m tape | 1449 | 1499 |

*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
60 meter DAT Tape — \$12, 10 Pack — \$110
90 meter DAT Tape — \$16, 10 Pack — \$130
120 meter DAT Tape — \$35, 10 Pack — \$300
All APS DAT Drives Include Retrospect by Dantz & 1 FREE DAT Tape



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- External plug in SCSI terminator.
- Anubis (by Charismac) formatting software

105MB \$369 270MB \$625



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- 32-bit bus master DMA transfers up to 20MB/sec across the NuBus.
- Bus master DMA reduces interrupts to computer thus increasing speed.

\$399 With any drive purchase. (Also available separately)



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|--|-------|
| ACS-50 Pair with 4.5Watt/ch. | \$80 |
| ACS-100 Pair with 6Watt/ch. | \$133 |
| ACS-3 Pair with Subwoofer (30Watt total) | \$181 |
| ACS-300 Pair with Subwoofer (36Watt total) | \$279 |

MICROPOLIS

NEW PRODUCT!

• Hard Drives specifically designed for enhanced digital video and audio performance in applications such as multimedia, desktop publishing, and video editing.

| Capacity | Model | Internal | External |
|----------|----------|----------|----------|
| 1000MB | MC2210AV | \$919 | \$999 |
| 1700MB | MC2217AV | \$1229 | \$1269 |
| 3000MB | MC1936AV | \$2199 | \$2299 |

HARD DRIVES

Quantum

WE HAVE THE DRIVE YOU WANT AT AN UNBEATABLE PRICE!



| Capacity | Model | Internal | External |
|----------|----------|----------|----------|
| 170MB | ELS170S | \$179 | \$239 |
| 270MB | LPS270S | \$238 | \$298 |
| 341MB | LPS340S | \$275 | \$335 |
| 540MB | LPS540S | \$444 | \$504 |
| 1080MB | EMP1080S | \$799 | \$859 |
| 1800MB | PD1800S | \$999 | \$1059 |

| Capacity | Speed | RPM | Buffer | Brand | Warranty | Internal | External |
|----------|-------|------|--------|------------|----------|----------------------------|----------|
| 170MB | 17ms | 3600 | 32K | Quantum | 2 Years | \$179 | \$239 |
| 240MB | 16ms | 4306 | 256K | Quantum | 2 Years | \$249 | \$309 |
| 240MB | 14ms | 4500 | 256K | Fujitsu | 1 Year | \$329 (2.5" for Powerbook) | |
| 270MB | 12ms | 4500 | 128K | Quantum | 2 Years | \$238 | \$298 |
| 340MB | 12ms | 4500 | 128K | Quantum | 2 Years | \$275 | \$335 |
| 520MB | 12ms | 4400 | 256K | Fujitsu | 5 Years | \$525 | \$585 |
| 540MB | 9.5ms | 5400 | 128K | Quantum | 2 Years | \$444 | \$504 |
| 1052MB | 8.5ms | 5400 | 256K | Micropolis | 5 Years | \$859 | \$889 |
| 1080MB | 9.5ms | 5400 | 512K | Quantum | 5 Years | \$799 | \$859 |
| 1080MB | 9.5ms | 5400 | 256K | Fujitsu | 5 Years | \$789 | \$849 |
| 1225MB | 10ms | 4500 | 512K | Quantum | 5 Years | \$965 | \$1030 |
| 1690MB | 8ms | 7200 | 1024K | Seagate | 5 Years | \$1459 | \$1559 |
| 1750MB | 10ms | 5400 | 256K | Micropolis | 5 Years | \$1169 | \$1199 |
| 1800MB | 10ms | 4500 | 512K | Quantum | 5 Years | \$999 | \$1059 |
| 2060MB | 12ms | 5400 | 256K | Fujitsu | 5 Years | \$1449 | \$1549 |
| 2145MB | 8ms | 7200 | 1024K | Seagate | 5 Years | \$1689 | \$1769 |
| 2148MB | 9ms | 5400 | 512K | Seagate | 5 Years | \$1429 | \$1529 |
| 3020MB | 11ms | 5400 | 256K | Micropolis | 5 Years | \$2139 | \$2169 |
| 9100MB | 12ms | 5400 | 512K | Micropolis | 5 Years | \$4099 | \$4199 |

Includes formatting software and cables.

SYQUEST DRIVES

| Capacity | Model | Speed | Buffer | Warranty | Internal | External |
|-----------|---------|--------|--------|----------|----------|----------|
| 44 / 88MB | SQ5110C | 20ms | 32K | 2 Years | \$379 | \$445 |
| 105MB | SQ3105 | 14.5ms | 64K | 2 Years | \$309 | \$369 |
| 270MB | SQ3270 | 13.5ms | 128K | 2 Years | \$579 | \$635 |

Media Qty 1 / 5 88MB \$96 / \$89ea. 105MB \$58 / \$56ea. 270MB \$93 / \$89ea.

Includes 1 Cartridge, formatting software, and cables. Multiple Syquest drive towers in stock!

CD ROM DRIVES

| Brand | Model | Speed | Transfer | Type | Internal | External |
|---------|-----------|-------|-----------|-----------------|----------|----------|
| Teac | CD-50 | 265ms | 335KB/sec | Single disk | \$309 | \$379 |
| Toshiba | XM3401 | 200ms | 330KB/sec | Single disk | \$369 | \$429 |
| NEC | CDR510 | 195ms | 450KB/sec | Single disk | \$459 | \$529 |
| Pioneer | DRM-602X | 300ms | 307KB/sec | 6 Disc Changer | n/a | \$969 |
| Pioneer | DRM-604X | 300ms | 614KB/sec | 6 Disc Changer | n/a | \$1209 |
| Pioneer | DRM-1804X | 300ms | 614KB/sec | 18 Disc Changer | n/a | \$2169 |

Includes driver software with music play, \$25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock!

TAPE DRIVES

| Capacity | Type | Brand | Speed | Internal | External |
|----------|-----------|--------------------|----------|----------|----------|
| 250MB | QIC 150 | Archive | 7MB/min | \$459 | \$529 |
| 2Gig | DAT | Conner | 11MB/min | \$829 | \$899 |
| 2Gig | DAT | Hewlett Packard | 12MB/min | \$959 | \$1019 |
| 4-8Gig | DAT | Conner | 88MB/min | \$1269 | \$1329 |
| 4-8Gig | DAT | Hewlett Packard | 42MB/min | \$1089 | \$1109 |
| 4-10Gig | DDS-2 DAT | Sony | 88MB/min | \$1269 | \$1329 |
| 4-10Gig | DDS-2 DAT | HP (Fastest Tape!) | 88MB/min | \$1449 | \$1499 |

Includes Retrospect 2.0 (#1 backup software), 1 tape, and cables.

OPTICAL DRIVES

| Capacity | Speed | Brand | Cache | Feature | Internal | External |
|----------|-------|----------------------|-------|---------------|----------|----------|
| 1.3Gig | 23ms | Hewlett Packard | 512K | MultiFunction | N/A | \$2659 |
| 1.3Gig | 19ms | Maxotix Tahiti III-4 | 4MB | MultiFunction | N/A | \$2799 |

Includes formatting software, 1 disk, and cables. 128MB and 650MB models also in stock.



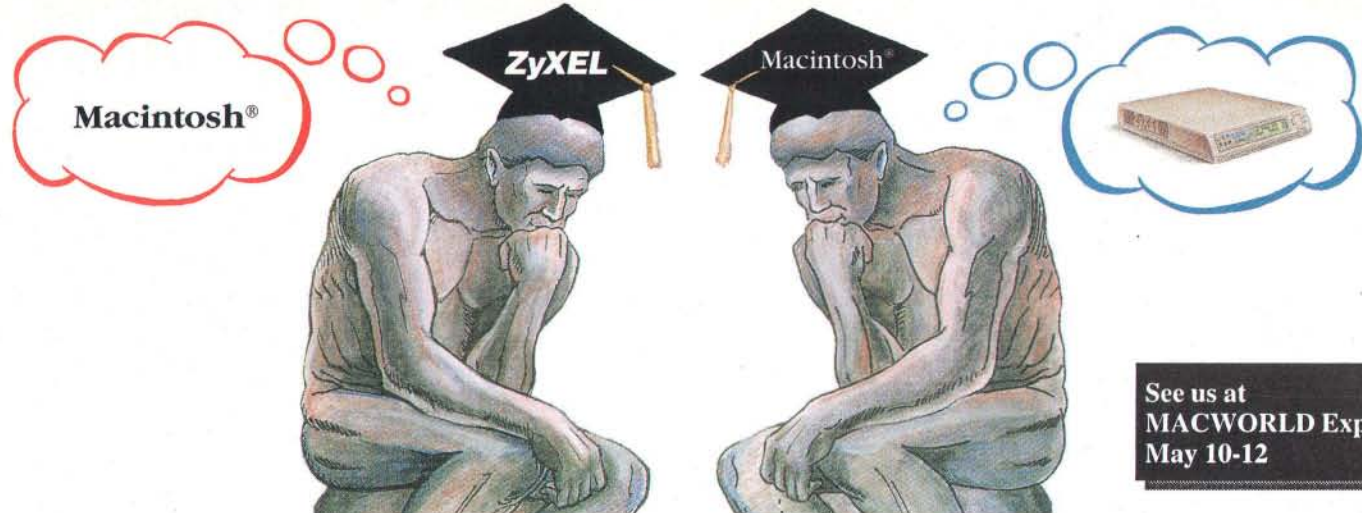
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The U-1496P Portable

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Product Index

ADVERTISER PAGE

Display Systems & Video

| | |
|--|-------|
| DGR Technologies 800-235-9748 | 183 |
| Mirror Technologies 800-643-4143 | 42-43 |
| Mitsubishi Display Products 800-843-2515 | 144 |
| Radius Inc. 800-996-7360 | 153 |

Education

| | |
|--|-----|
| Educational Resources 800-624-2926 | 164 |
| IVI Publishing 800-278-5533 | 162 |
| MacAcademy 800-527-1914 | 68 |

Entertainment

| | |
|-----------------------|----|
| Electronic Arts | 47 |
|-----------------------|----|

Financial Management

| | |
|---------------------------------------|----|
| Aatrix Software 800-462-0854 | 14 |
| CheckMark Software 800-444-9922 | 49 |

General Hardware & Accessories

| | |
|--|-----|
| Moustrak 800-221-6687 | 64 |
| Orange Micro 714-779-2772 | 139 |
| VST Power Systems, Inc. 508-287-4600 | 48 |

Graphics & Design

| | |
|--|---------|
| Adobe Systems Inc. 800-833-6687, Dept E, ext. 1106 | 115 |
| ASDG 608-273-9240 | 50 |
| Deneba Software 305-596-5644 | 13 |
| Engineered Software 910-299-4843 | 18 |
| Fractal Design, Corp. 408-688-8800 | 6 |
| Graphsoft 410-290-5114 | 55 |
| Letraset 800-343-TYPE | 149 |
| Macromedia 800-945-4058 | 100-101 |
| RasterOps 800-SAY-COLOR | 66, 159 |
| Strata 800-869-6855 | 70 |
| SuperMac 800-334-3005 | 132 |

Input Devices

| | |
|----------------------------------|---|
| CIC 800-888-9242 ext. 5005 | 5 |
|----------------------------------|---|

Mail Order

| | |
|--|---------|
| Advance Business Center 800-723-8262 | 168 |
| Bottom Line Distribution 512-472-4956 | 182-183 |
| ClubMac 800-258-2622 | 186-187 |
| Computer Discount Warehouse 800-291-4CDW | 194-195 |
| Direct Connections 800-572-4305 | 164 |
| Dr. Mac 800-825-6227 | 199 |
| Express Direct 800-765-0040 | 172-173 |
| First Source International 800-251-9866 | 176 |
| LLB Company, The 800-848-8967 | 174-175 |
| Mac Zone, The 800-436-8000 | 32-35 |
| Mac's Place 800-897-9009 | 67 |
| MacCenter 800-950-3726 | 170 |
| MacConnection 800-800-4444 | 177-179 |
| MacLand 800-333-3353 | 169 |
| MacMall 800-222-2808 | 165 |
| MacProducts, USA 800-622-3475 | 180 |
| MacWarehouse 800-255-6227 | 184-185 |
| MegaHaus 800-786-1191 | 190 |
| SuperMicro 800-352-3415 | 167 |
| Syex Express 800-876-3467 | 171 |
| Third Wave Computing 800-624-9307 | 181 |
| USA Flex 800-950-0354 | 192 |

Networking & Connectivity

| | |
|--|----------|
| Apple Computer, Inc. | 128-129 |
| Asanté Technologies 800-662-9686 | 20 |
| CE Software 800-5CESOFT | 10 |
| Dayna 801-269-7340 | 136, 137 |
| Focus Enhancements 800-538-8862 | 17 |
| SoftArc Inc. 416-299-4723 | 7 |
| ZyXEL 800-255-4101 | 191 |

ADVERTISER PAGE

Organizational Tools

| | |
|--|---------------|
| Attain Corp. 617-776-1110 | 12 |
| Gold Disk, Inc. 800-465-3375 | 25, 155 |
| Inspiration Software (Ceres Software) 800-877-4292 | 152 |
| Microsoft | Covers 2-4, 1 |

Output Devices

| | |
|--|-----------|
| Brother International Corporation 908-356-8880 | 16 |
| Digital Equipment Corp 800-777-4343 | 122-123 |
| NEC Technologies 800-NEC-INFO | 26-27 |
| Tektronix 800-835-6100 | 71 |
| Texas Instruments 800-527-3500 | 57, 59 |
| Texas Instruments 800-527-3500 | 60-61, 63 |
| Xante Corporation 800-926-8839 ext. 2209 | 156 |

Performance Enhancers

| | |
|------------------------------------|----|
| DayStar Digital 800-962-2077 | 36 |
| TechWorks 800-421-7758 | 92 |

Resources

| | |
|-----------------------------------|-----|
| CompuServe 800-848-8199 | 138 |
| IVI Publishing 800-278-5533 | 162 |

Scanners

| | |
|--|-------|
| AGFA Div. - Scanner 800-685-4271 | 72 |
| Epson 800-BUY-EPSON | 8-9 |
| MicroTek Labs, Inc. 800-654-4160 | 124 |
| Mirror Technologies 800-643-4143 | 42-43 |

Spreadsheets & Numerical Analysis

| | |
|--|----|
| Abacus Concepts, Inc. 800-666-STAT | 18 |
|--|----|

Storage Systems

| | |
|-------------------------------------|------------|
| APS Technologies 800-235-3707 | 188-189 |
| FWB, Inc. 415-474-8055 | 160 |
| Iomega 800-756-3959 | 51 |
| La Cie Limited 800-999-1455 | 87-91 |
| MegaHaus 800-786-1191 | 190 |
| NEC Technologies 800-NEC-INFO | Covers 5-8 |
| Pinnacle Micro 800-553-7070 | 41 |
| PLI 800-288-8754 | 154 |
| TDK 800-835-8273 ext. 203 | 65 |

Telecommunications

| | |
|---|---------|
| America On-Line | 147-148 |
| Hayes Microcomputer Products, Inc. (Smartcom II) 800-874-2937 | 19 |
| PSI 800-236-6952 | 166 |
| Supra Corp. 800-944-8772 | 146 |

Utilities

| | |
|--|-----|
| Aladdin Systems 408-761-6200 | 73 |
| Berkeley Systems 510-540-5535 | 4 |
| Central Point 800-277-3874 | 44 |
| Charles River Analytics 800-913-3535 | 56 |
| Connectix Corporation 800-950-5880 | 142 |
| Dantz Development 510-849-0293 | 28 |
| DataViz, Inc. 800-732-0030 | 130 |
| Datawatch 919-549-0711 | 24 |
| Insignia 800-848-7677 Dept. A | 135 |
| Now Software 800-237-2078 | 150 |
| Teknosys 800-873-3494 | 62 |

Word Processing

| | |
|--------------------------------|-------|
| WordPerfect 800-526-2296 | 74-75 |
|--------------------------------|-------|

General

| | |
|-----------------------------------|------------|
| Apple Computer, Inc. | 15, 17, 22 |
| Apple Computer, Inc. | 109-111 |
| Apple Computer, Inc. | 140 |
| Intel 800-395-7009 ext. 111 | 30-31 |



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|-------------------|--------|
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Advertiser Index

| RS# | ADVERTISER | PAGE | RS# | ADVERTISER | PAGE |
|-----|------------------------------------|---------|-------|-----------------------------|----------|
| 48 | Aatrix Software | 14 | 154 | Insignia | 135 |
| 168 | Abacus Concepts, Inc. | 18 | N/A | Inspiration Software | 152 |
| N/A | Adobe Systems Inc. | 115 | N/A | Intel | 30-31 |
| 150 | Advance Business Center | 168 | 125 | Iomega | 51 |
| 52 | AGFA Div. - Scanner | 72 | N/A | IVI Publishing | 162 |
| 55 | Aladdin Systems | 73 | 47 | La Cie Limited | 87-91 |
| N/A | America On-Line | 147-148 | 65 | Letraset | 149 |
| N/A | Apple Computer, Inc. | 109-111 | 88 | LLB Company, The | 174-175 |
| N/A | Apple Computer, Inc. | 128-129 | 135 | Mac Zone, The | 32-35 |
| N/A | Apple Computer, Inc. | 140 | 167 | Mac's Place | 67 |
| N/A | Apple Computer, Inc. | 15 | 83 | MacAcademy | 68 |
| N/A | Apple Computer, Inc. | 17 | 1 | MacCenter | 170 |
| N/A | Apple Computer, Inc. | 22 | N/A | MacConnection | 177-179 |
| 146 | APS Technologies | 188-189 | 152 | MacLand | 169 |
| 86 | Asanté Technologies | 20 | 14 | MacMall | 165 |
| 6 | ASDG | 50 | 144 | MacProducts, USA | 180 |
| 60 | Attain Corp. | 12 | 110 | Macromedia | 100-101 |
| N/A | Berkeley Systems | 4 | 156 | MacWarehouse | 184-185 |
| 21 | Bottom Line Distribution | 182-183 | 160 | MegaHaus | 190 |
| 98 | Brother International Corporation | 16 | N/A | Microsoft | C2-C4, 1 |
| N/A | CE Software | 10 | 159 | MicroTek Labs, Inc. | 124 |
| N/A | Ceres Software | 152 | 118 | Mirror Technologies | 42-43 |
| 69 | Central Point | 44 | 166 | Mitsubishi Display Products | 144 |
| 49 | Charles River Analytics | 56 | 94/95 | Moustrak | 64 |
| 38 | CheckMark Software | 49 | 116 | NEC Technologies | 26-27 |
| N/A | CIC | 5 | 104 | NEC Technologies | C5-C8 |
| 121 | ClubMac | 186-187 | 142 | Now Software | 150 |
| N/A | CompuServe | 138 | 130 | Orange Micro | 139 |
| 136 | Computer Discount Warehouse | 194-195 | 141 | Pinnacle Micro | 41 |
| 62 | Connectix Corporation | 142 | 155 | PLI | 154 |
| 28 | Dantz Development | 28 | 75 | PSI | 166 |
| 162 | DataViz, Inc. | 130 | 68 | Radius Inc. | 153 |
| 163 | DataViz, Inc. | 130 | 58 | RasterOps | 159 |
| 3 | Datavatch | 24 | 63 | RasterOps | 66 |
| 33 | Dayna | 136 | 64 | SoftArc Inc. | 7 |
| 34 | Dayna | 137 | 45 | Strata | 70 |
| 93 | DayStar Digital | 36 | 74 | SuperMac | 132 |
| 165 | Deneba Software | 13 | 20 | SuperMicro | 167 |
| 143 | DGR Technologies | 183 | 76 | Supra Corp. | 146 |
| 78 | Digital Equipment Corp. | 122-123 | 39 | Syex Express | 171 |
| 41 | Direct Connections | 164 | 90 | TDK | 65 |
| 35 | Dr. Mac | 199 | 128 | TechWorks | 92 |
| 112 | Educational Resources | 164 | 36 | Teknosys | 62 |
| 56 | Electronic Arts | 47 | 122 | Tektronix | 71 |
| 73 | Engineered Software | 18 | N/A | Texas Instruments | 57 |
| N/A | Epson | 8-9 | 138 | Texas Instruments | 59 |
| 124 | Express Direct | 172-173 | 139 | Texas Instruments | 60-61 |
| N/A | First Source International | 176 | 140 | Texas Instruments | 63 |
| 127 | Focus Enhancements | 117 | 147 | Third Wave Computing | 181 |
| 24 | Fractal Design, Corp. | 6 | 145 | USA Flex | 192 |
| 71 | FWB, inc. | 160 | 32 | VST Power Systems, Inc. | 48 |
| 26 | Gold Disk, Inc. | 155 | N/A | WordPerfect | 74-75 |
| 22 | Gold Disk, Inc. | 25 | 126 | Xante Corporation | 156 |
| 108 | Graphsoft | 55 | 25 | Ziff-Davis Press | 158 |
| 61 | Hayes Microcomputer Products, Inc. | 19 | 115 | ZyXEL | 191 |

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| Communications | | | | Scientific | 206 | | |
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| Data Acquisition | | | 228 | Shareware | | | |
| Disk Drives | 201,203 | | | Statistics | | | |
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| General | | 214 | | Adult Software | | 225 | |
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| Networking | | | | Accessories | | 223 | |
| Peripherals | 202 | 218 | | Books/Catalogues | | | |
| Powerbook Products | 203 | | | Business Opportunities | | | |
| Power Supplies | | | | Consulting/Programming | | | |
| Printers | 204 | | 228 | Data Conversion Services | | 223 | |
| Scanners | | 218 | | Data Recovery Services | | 223 | |
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| Tape Drives | | | | Diskette Copy Services | | 224 | |
| Used Equipment | | | | Furniture | | | |
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| SOFTWARE | | | | Novelties | | | |
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| Bar Coding | | 218 | | Slide Imaging Services | | 224 | |
| Business | 204 | | 228 | Supplies | | 224 | |
| Business Time Management | | | | Training | | | 229 |
| CAD/CAM | | 219 | | | | | |
| CD-ROM | 204 | 219 | | ACCOUNT REPRESENTATIVES | | | |
| Communications/Networking | | 219 | 229 | East Coast —CT, DC, DE, FL, GA, MA, MD, ME, NC, NH, NJ, NY, PA, RI, SC, VA, VT, WV | | | |
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| Foreign Languages | 205 | 222 | | | | | |
| Genealogy | | | | | | | |
| General | | 222 | | | | | |
| Government | | | | | | | |
| Graphics | | 222 | | | | | |
| Health | | | | | | | |
| Language Tools | 206 | | | | | | |
| Legal | | | | | | | |
| Lottery | | | | | | | |
| Medical/Dental | | | 229 | | | | |
| Music/MIDI | 206 | 223 | | | | | |
| Networking | | | | | | | |
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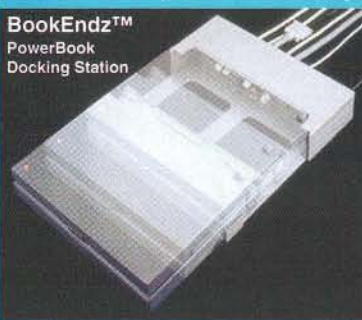
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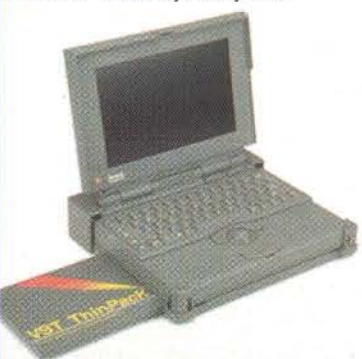
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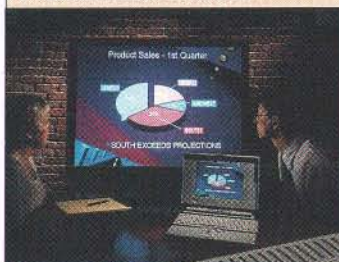
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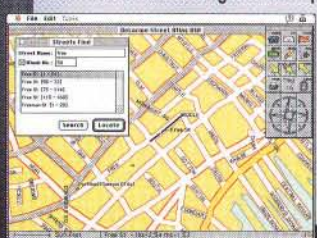
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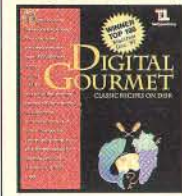
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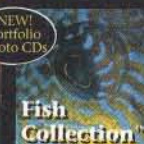
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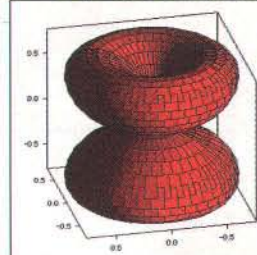
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| 950 8/400 | 3295 |
| 950 64/2.0 | 6295 |
| 605 8/160 | 1175 |
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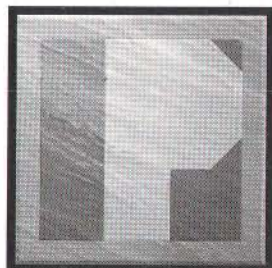
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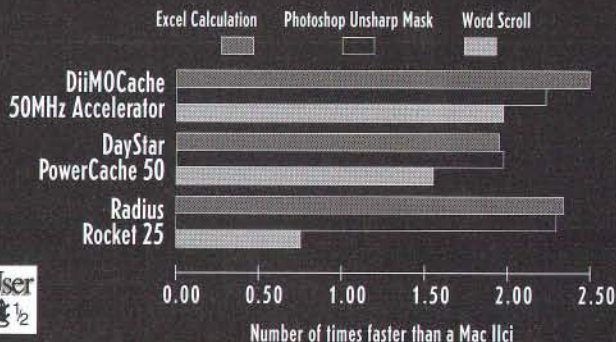
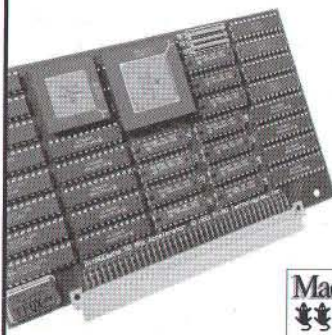
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| T.I. MicroLaser 1 MB | 39.00 |
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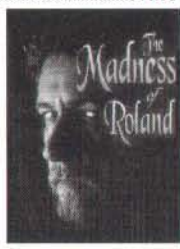
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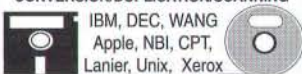
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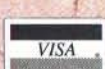
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You'll Do Windows

DON'T BLAME ME AS Mac developers bail out for the larger Windows market.

It's those Mac turncoats, who are threatening the Mac's future, that you should condemn, not me. Because of them, you'll end up using a Windows machine — whether you like it or not.

Even as greedy developers rewrite applications for Windows, the Mac still holds an edge with the creative community of artists and writers. Graphical applications still feel and work better on the Mac, and so does typesetting. But although Power Macs are upping the speed ante, will the Mac ever be the only machine you'll ever need? I hate to say it, but the answer is no.

I've been searching for a one-platform solution to my computing needs for years. I've always had more than one machine, except for the few moments in the '70s when I used a SOL-20 8080 computer exclusively.

More recently, with the advent of OS/2 — which more closely resembles a Mac than Windows does — and its powerful multitasking, I thought I'd found the answer. With OS/2 you can format a disk while downloading a file and sorting a massive database. Try that with a Mac.

Unfortunately, OS/2 is enslaved by the poor architecture of the PC itself. The original PC was released in 1981 and based on the machines of the late '70s. Suppose the Mac

had been based on the Apple II, for example. Can you imagine how horrible and limited it would be? Because the Mac stole from the high end of the spectrum, taking its ideas from the Xerox Star, it

wasn't hampered by the designs and thinking of '70s microcomputing. Although fun, the computers of the '70s were amateurish in every way. But they were *for* amateurs, so nobody cared.

Back in the present, with Intel stuck in the rut of success and Microsoft unable to resist the lure of an installed base of 100 million DOS and Windows machines, there's little chance of improving the architecture. In an attempt to modernize the PC, Microsoft has invented something called Microsoft at Work, a set of parameters designed to restandardize interfaces, from machines to peripherals. You know, kind of like the Apple SCSI we've had for a decade.

Anyway, the whole PC scene is as out of control as ever. I was amused the other night, when someone said that Apple could have owned the world if it had just opened up its architecture and licensed its operating system. I think not. Tightly controlling the architecture is essential for plug-and-play to work. And now that Apple is offering to license its design, I don't see anyone flocking to do a Mac clone. Some will say too little was offered too late. Maybe, but the Mac market is bigger than ever. Seems like a good time to me.

Unfortunately, the range of applications available requires serious users to consider using multiple computers, especially in a home office. I use four machines. I thought I could get away with two — a Mac and a PC — but I got involved in video and had to get an Amiga for a Video Toaster. Then along came OS/2, which I preferred to Windows. Before long, OS/2's limitations forced me to get a dedicated Windows machine to look at products that worked poorly under the OS/2

version of Windows. There weren't many of these programs, but there were enough to be a nuisance. Will it be much longer before I need five computers?

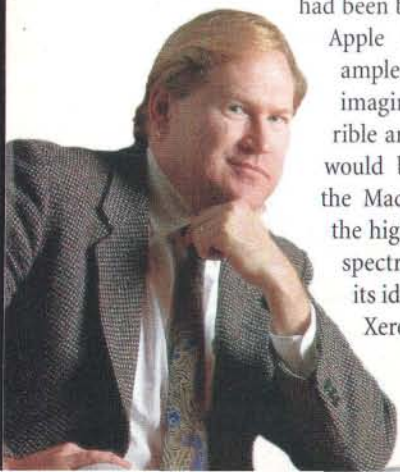
I can't figure out where to put the fifth one. It's ridiculous. I'm sure that over the next year or so, many Mac users will have to buy a Windows machine to run some oddball application that should have been developed for the Mac in the first place. Your competition will be using the application and will have an edge on you if you don't get on board. You'll call the developers and ask when they are going to port to the Mac, and the developers will say that they plan to but can't say when. That means "never!" in developerspeak, by the way.



Sure, Power Macs can run Windows, but they can't run it as fast as Pentium machines do. It doesn't matter how many times Apple says SoftWindows on Power Macs is "fast enough" for most applications. Users always want the fastest machine for the money. Besides, many Windows *applications* are incompatible with SoftWindows, because it doesn't support 386 Enhanced mode. Even if you can run Windows faster than anybody else, it won't do you much good if you can't run your favorite app.

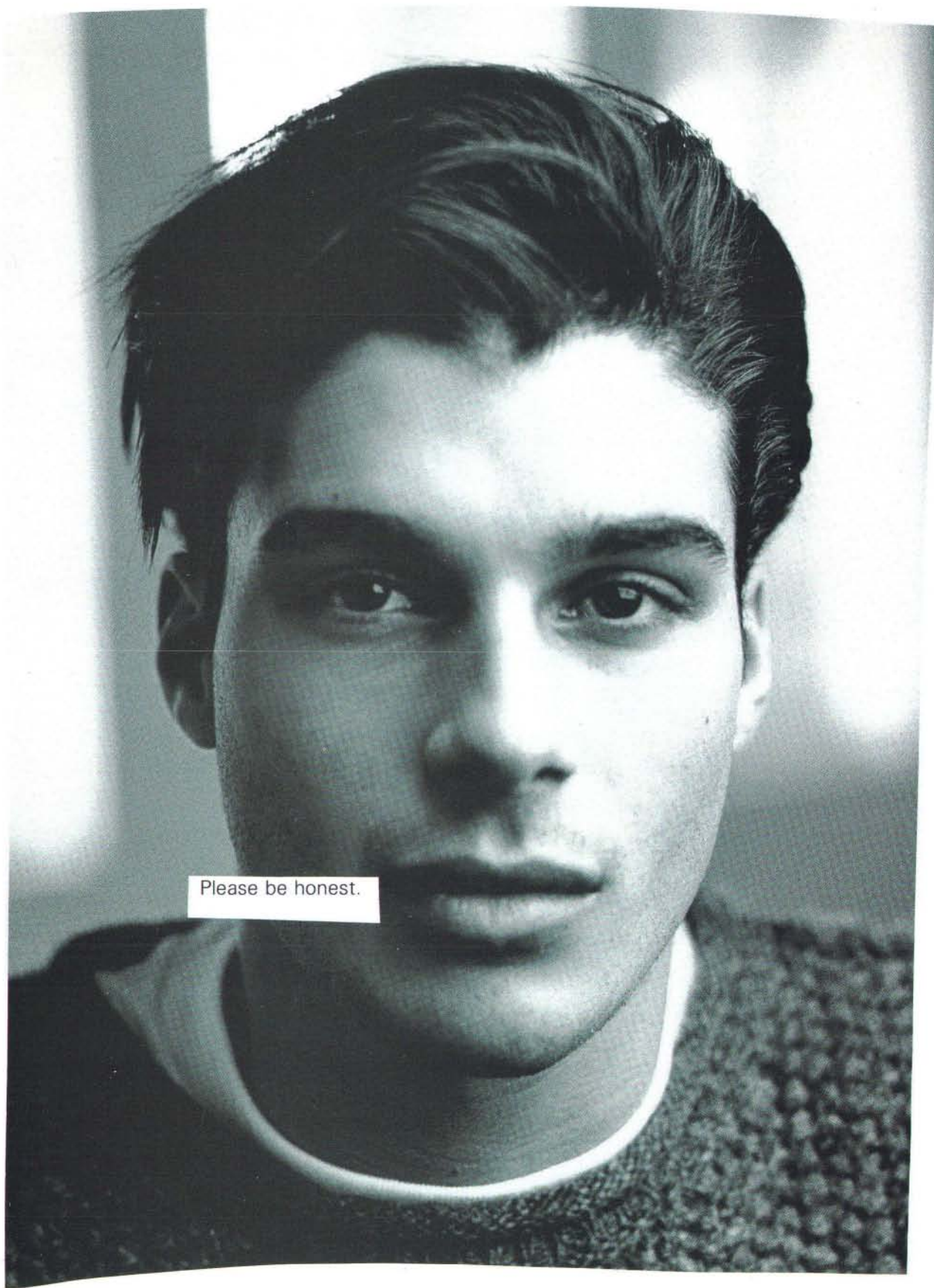
I don't want you to give up your beloved Mac. But don't expect to run Windows software on it. Get out your wallet. Make room for another computer.

And, by the way, you won't like it. ☹



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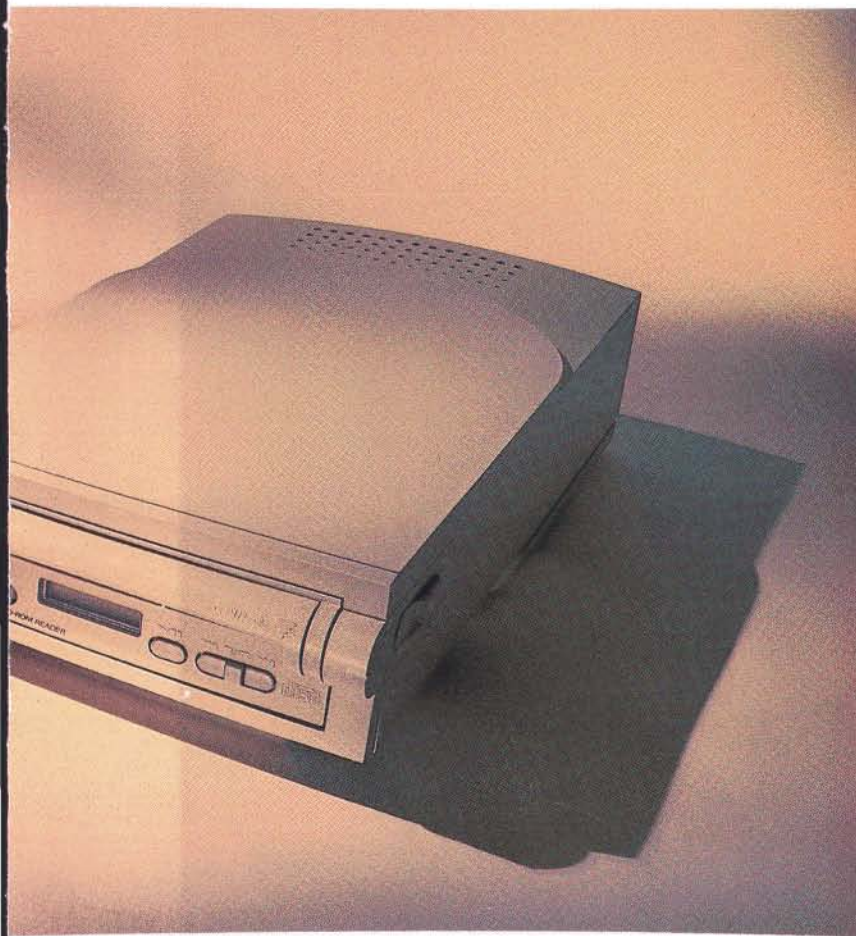


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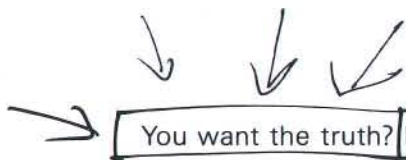
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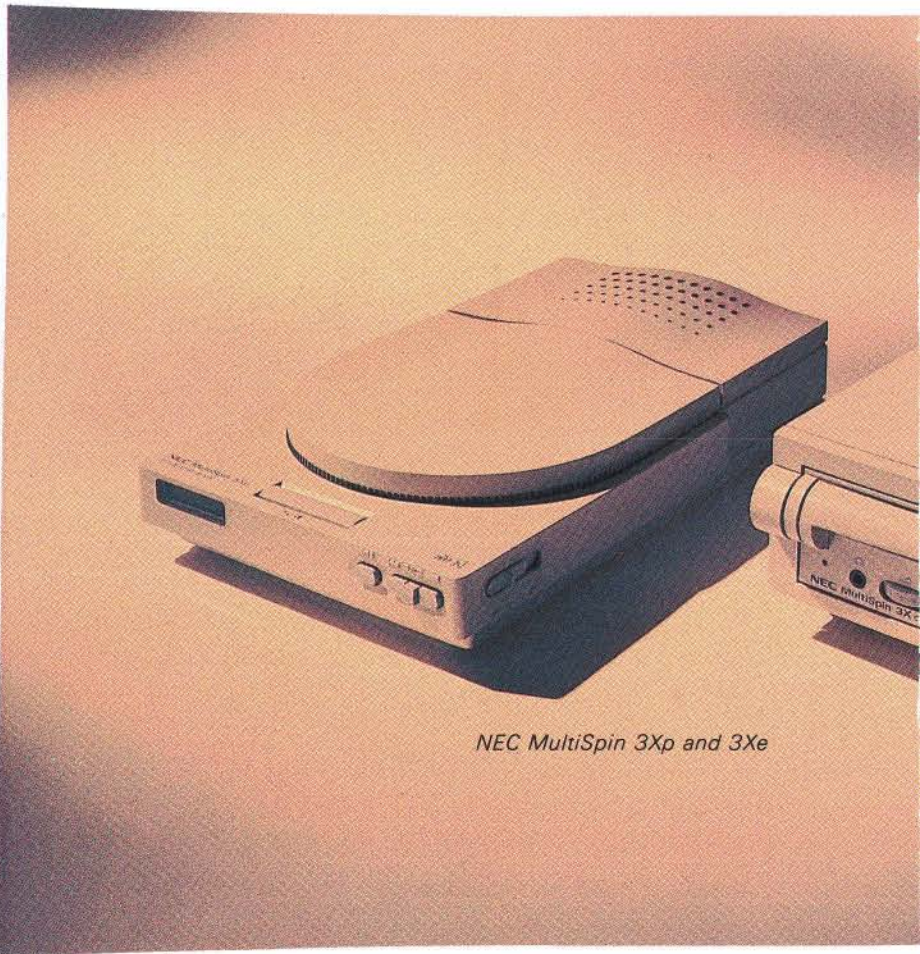
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